The Iron Age

A Review of the Hardware and Metal Trades.

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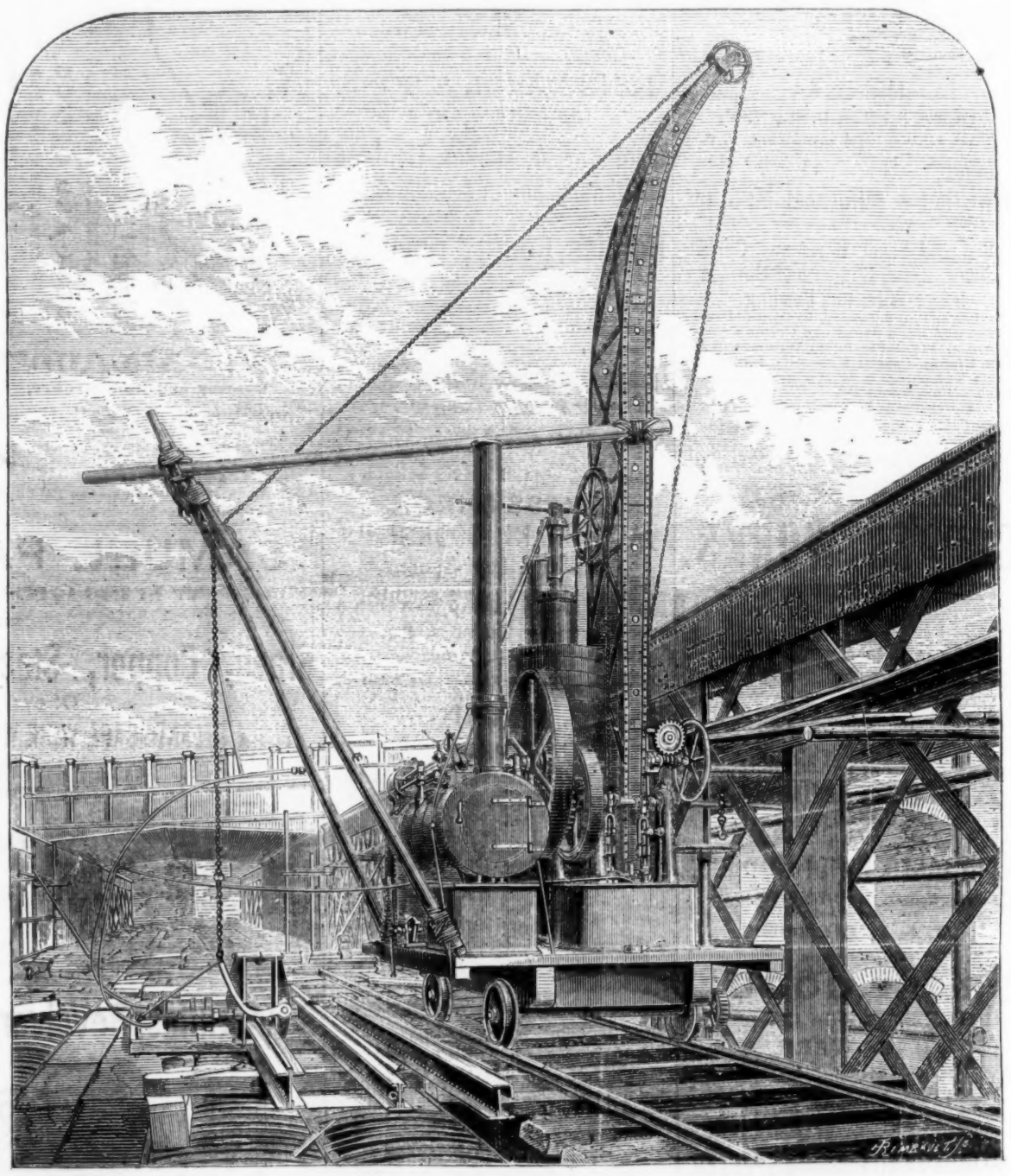
Hydraulic Riveter for Bridge Work.

The accompanying illustration represents a hydraulic riveting machine now in use in the construction of a bridge on the Great Eastern Railway, near London. The machine was invented by Mr. R. H. Tweddell, and embodies many features of novelty and excellence. The crane jib, together with the boiler and engine, is mounted on a swinging platform, which turns around the column of the accumulator as a center—this column, in fact, forming a crane post. The overhang of the jib, instead of being adjusted by a screw, is controlled by a chain as shown, the raising and lowering of the jib, as well as the hoisting, being performed by steam-power. The shafts of both the chain barrels carry worm wheels, and, by means of clutches, either or both of the worms gearing into these wheels can be driven from a shaft which, in its turn, derives its motion from the engine through the intervention of bevel gear. Another clutch connects to the shaft just mentioned a third worm, which gears into a worm wheel carried by a vertical shaft, this shaft having at its lower end a pinion which gears into a large spur wheel situated beneath the swinging platform of the crane. This wheel can be locked fast to the carriage, and, when thus fixed, it forms an annular rack, which serves as an abutment for the pinion on the vertical shaft, and thus enables the whole crane, &c., to be slewed by the engine. On the other hand, if the crane platform is locked to the under carriage, and the large spur wheel left free, then, when the vertical shaft is running, its pinion turns the large spur wheel, and the latter communicates its motion by another spur wheel and bevel gear to one of the axles of the carriage, thus traversing the latter along the rails. Hoisting, slewing and traveling can thus be performed by steam-power, and the handiness of the machine for lifting plates into position is much increased. By means of a clutch on the axle, also, the steam traveling arrangement can be thrown out of gear, and the machine can then be traveled by hand, gear being provided for this purpose, as shown.

The engine, which is placed vertically, drives the hydraulic pumps direct, the steam cylinder being above, and the pumps below, while the crank shaft is between them. The engine is fixed to the boiler, and the latter is of a somewhat peculiar pattern, it being, in fact, a boiler and rivet furnace combined. What may be termed the fire box extends through the boiler from end to end, the rivet heating furnace being built up within it. The products of combustion from the rivet furnace pass along the top of the latter, between it and the fire box crown, and thence through a group of tubes arranged as shown, escaping thence to the chimney. This combination of a rivet furnace and boiler forms an exceedingly neat and convenient arrangement.



TWEDDELL'S PORTABLE HYDRAULIC RIVETER FOR BRIDGE WORK.

Treatment of Lead by Steam.

BY M. ROZAU.

In place of stirring the molten lead, either by hand or by steam-power, steam is introduced and causes a violent and continued boiling of the whole mass of metal in fusion, most favorable to the separation of the silver from the lead, and the purification of the latter.

The above action is, of course, purely mechanical. As to its chemical action, although feeble, on account of its being in the presence of metals which do not become decomposed at the temperature at which the operations are carried on, that is to say about 330° centigrade, it is sensibly felt, for the lead undergoes a refining action independent of that which results from its fusion at a dull red heat previous to crystallization, so much so that all previous refining is dispensed with in the case of moderately hard lead, though not when the metal is very hard.

If the chemical action of the steam were *nil*, the purity of the lead produced without previous refining could only be attributed to the series of partial refinings to which the lead is submitted by the fact of a great number of remeltings at a dull red heat; but a fact which tends to show that the steam exercises a chemical action is, that the oxides which are produced are first yellowish and earthy, but as the operation proceeds, become black and heavily charged with copper, a circumstance which is not produced in the boilers of the ordinary system in spite of the most vigorous stirring. Toward the end of the operation, while the steam is still in action, in the liquid portion in which are concentrated the silver, copper, antimony and arsenic, the lead is found to have been deprived of the copper which it contained. The antimony is gradually eliminated by the oxidation caused by the air during the remeltings; soft lead gives even more oxide than hard lead containing more antimony, which proves that the latter oxidizes first and preserves the lead from oxidation.

The lead produced by the steam method is perfectly soft, and beside a suppression of a special operation of refining, the employment of steam offers many advantages, as the saving of the cost of previous purification, reduction of oxidation of the lead, and consequently of waste. The economy of time and labor is due to the rapidity of the operation, the smaller number of hands required, while superior workmen are necessary in the old system than in the present, and also more space.

When the lead to be dealt with contains not more than one-half per cent. of antimony, it may be operated upon by the new system directly, and the purification becomes reduced to that of the rich dross, and the expense to about one-fifth of that by the ordinary mode. In the case of lead which contains a larger amount of antimony, previous purification is necessary, but this operation need not be carried so far as in the ordinary process; it may be arrested when only half per cent. of antimony remains in the lead. The arsenic having the greatest tendency to take the place of the silver, it has been proposed to effect the purification by means of soda.

The apparatus employed in the steam system consists of an upper and lower boiler, each with its own furnace; the former, for the melting of the lead and separating the silver, will contain about nine or ten tons, and the latter, which is for the crystallization, from fifteen to sixteen tons. A stage erected around the lower boiler allows the workmen to watch the operation and remove the oxides. The metal is run from the upper to the lower vessel through tubes fitted with friction valves moved by means of a lever; and in order to prevent the lead from penetrating into the steamway pipe a valve cock is adopted.

The lead having been melted in the upper boiler is skimmed and run off into the lower one, and at that moment a small jet of steam is let in to effect the mixture of the crystals of the previous operation with the lead in fusion. A small stream of water thrown upon the surface of the lead at the commencement of the operation facilitates the formation of the crystals. The steam is introduced from a boiler close at hand, under the pressure of three atmospheres, through a lateral tube near the bottom of the lower boiler, and is distributed uniformly by means of a horizontal disc of cast iron placed over the nozzle of the steam pipe in the center of the lower part of the boiler. The boiler is fitted with a cover in segments, which are opened alternatively every five or six minutes, when a workman detaches such lead as has been flung by the action of the escaping steam against the upper sides of the boiler and adhered there. Beneath the lower boiler are two small supplementary furnaces, which bring up the discharge tubes to the proper temperature, and are lighted just previous to the drawing off.

The workmen remove the oxides once only during the operation, before the introduction of the steam, but the top of the boiler is fitted with a chimney which places it in communication with the condensation chambers, where the steam arrives, carrying with it a part of the oxides, which are deposited in a pasty state.

The lead is run off when about two-thirds are in the state of crystals; the lead is received in conical vessels sunk in the ground, the metal ways being furnished with gratings to keep back any crystals. Two pigs of 2¼ tons each are produced at each operation. The pigs obtained from successive operations are lifted by a steam crane and arranged according to their quality, and those of superior quality are collected together until the quantity is large enough to commence a new series of operations, starting from the point reached in the former. When the lower boiler is run off, the lead which has been melted in the upper one during the crystallization is turned into the former, and the operation is repeated.

When merchant lead or complementary lead are in the state of crystals, these are melted by lighting the furnace under the lower boiler, and the lead is run off into ingots placed in a half circle, and filled by means of a gutter moving upon a pivot.

The word operation is applied to the total of the work done between the drawing off the lead from the upper boiler into the lower, and the running of the enriched lead into the ingots. The time of an operation is one hour and a half. The running of the merchant or complementary lead counts for two operations, because the time necessary for the melting of the crystals in the lower boiler is nearly double that occupied by the crystallization. The number of operations representing this running is, for lead of 125 grammes, 25 to 30 per cent. of the number of crystallization. The number of operations is on an average thirteen in twenty-four hours, but it sometimes amounts to sixteen or seventeen, according to the nature of the fuel, the draught and the proximity of the steam boiler; it varies also with the tenure. An apparatus dealing with lead of 123 grammes produces six to seven tons of merchant lead per twenty-four hours.—*La Metallurgie.*

The Syracuse Iron Works

Are situated in Geddes, on Fayette street. The company was organized twelve years ago, with a capital of $30,000, by Mr. R. N. Gere, the president. The capital of the company at present is nominally $200,000. The products of the works are principally merchant bar, band and hoop iron, and spikes and rivets. The works are now running upon a fine class of work, and the company prides itself on its facilities in dealing with the finer kinds of work. This concern does not seem to have felt the general dullness in the iron trade, but claims to have been quite busy during the last six or seven months, and have kept 175 men constantly employed.

The works cover about two acres. The rolling mill proper is 280 feet long and 112 feet wide. A portion of this is a new building built only two years ago. The walls of the latter structure are of brick and are 22 feet high; the roof is of wood and slated, and the hight of the peak is 60 feet. The remaining portion of the rolling mill is entirely of wood, and it is the purpose of the company to tear down this portion of the structure and replace it with a new building similar to the one now standing. The length of the new section is 170 feet. Eight stacks tower above this portion of the structure, and vary in hight from 50 to 70 feet; they are 4 feet square at the base. Five of them (those most recently erected) do not extend to the ground, but rest on cast iron columns 7 feet high. This affords greater facilities in manipulating the furnace doors and economizes space. There are 10 boilers in various parts of the rolling mill, connected by pipes to a main steam pipe, which supplies the two larger engines with steam. The diameter of the latter pipe is 10 inches. The two main engines are situated on opposite ends of the mill, and have each 200 horse-power. There are also three vertical engines in this shop, one of which has 30 horse-power, and drives the fans and runs a pair of shears. Another has 20 horse-power, and the other 15. One is used for driving the shears and for hoisting, and the other is an oscillating engine and drives the machinery of the machine shop. These engines are supplied with steam from supply pipes which tap the main steam pipe. When necessary, each of the smaller engines may be supplied with steam from a single boiler.

The rolling machinery of the shop consists of one train of puddle rolls and three trains of finishing rolls. The puddle rolls are 15¼ inch, and the other trains 8 inch, 8½ inch and 15¼ inch respectively. The shop is also provided with four pairs of shears, each capable of cutting 3 inch round iron, a saw for cutting bars of finished iron so as to leave a flat surface, a Burden squeezer and a Belknap spike machine. The smallest train of rolls in this shop is run by a belt. This belt has a triangular or V shaped section, and fits into a corresponding groove in the face of the pulley. The angle of the groove is, however, a little more acute than that of the belt. The object of this is to prevent the belt from slipping when a great resistance is offered by the rolling machinery. In such a case the belt is forced deeper into the groove, and, being more tightly wedged the greater the resistance, it is impossible for it to slip. The thickness of this belt is 3 inches, and the plan is employed in all parts of the mill where it is practicable.

The forge building contains six heating furnaces and three double puddling furnaces, the latter of which will turn out about 12 tons of puddled iron every 24 hours. From five to six heats are made per day, and about nine balls are obtained from each heat. This building adjoins the rolling mill, and the balls are run in on overhead railways about 75 feet long. But one blower is used for the furnaces of the whole establishment; this, however, is a very effective one, and is amply sufficient. The store room is at one end of the rolling mill and communicates with it by a small railway. The company proposes to tear down some of its old buildings, and in their stead to erect four more puddling furnaces. The foundation of the first furnace is already being laid.

The machine shop is situated on the first floor of a small building, and contains three planers, two turning lathes, the larger of which will swing 4 feet and take in 14 feet, a bolt cutter, a drill and a nut tapping machine. The latter is a novelty; it is provided with three taps, which work simultaneously. A boy feeds the nuts to the respective heads, and as all three taps are working at once, he is kept constantly busy, the nuts being turned off as fast as he can feed them. Over the machine shop is the pattern shop and office. The shipping facilities of these works are exceptional. The rolling mill is situated alongside of the Erie canal, and opens upon the canal with wide doors, which may be closed at night and whenever necessary. Here, coal can be unloaded or iron loaded directly into the boats. Outside of the works is a derrick, which hoists coal from the boats. One man attends to the hoisting, weighing the coal when it is hoisted, dumping it and running the hoisting engine, which is situated within the works.

Broad and narrow gauge car tracks from the Oswego and Syracuse and New York Central Railroads run up to the doors of the works, and freight is received and shipped by rail with great facility.

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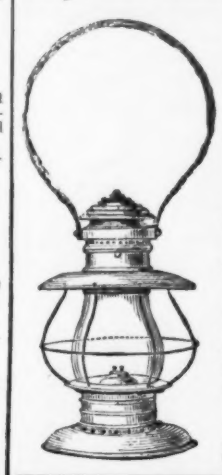

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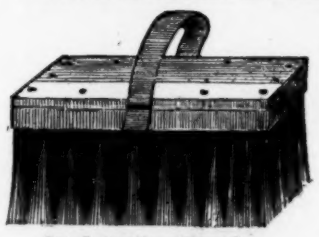

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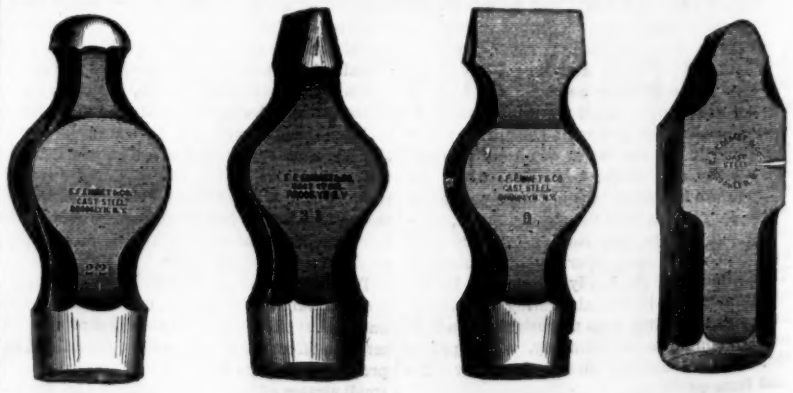

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Solid Box Vises,

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Our Vises are Warranted to do more work than any other make. No broken boxes or screws.

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TIN PLATE, SHEET IRON, WIRE, COPPER,

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N. B. See the Chicago Metal Market quotations in this paper, page 33.

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This Welding Compound is of indispensable utility in all establishments where iron and steel are forged, whether on a large or small scale. It perfectly unites iron to iron, iron to steel, steel to steel, wrought iron or steel to cast iron, and iron or steel to Bessemer metal, without requiring the parts to be welded to be brought above a cherry red heat, and effecting a great saving in fuel over all other welding compounds or fluxes which require the metals to be brought to a white heat.

This compound is manufactured under the inventor's personal supervision, and is sold and warranted genuine under the above trade mark, in 5, 10, 50 and 100 lb. packages. Price for 5 and 10 lb. packages, 30 cents per lb.; for 50 and 100 lb. packages, 25 cents per lb. Samples sent on order.

The advertiser respectfully refers to the following establishments in which his welding compound is exclusively used: TERWILLIGER & Co., Safe Makers, New York; TRENTON VISE & TOOL WORKS, Trenton, N. J.; BENJ. ATHA & Co., Newark Steel Works, Newark, N. J.; WASHOE TOOL MFG. CO., Elm Park, Staten Island; CYRUS CURRIER & Co., Engine Builders, Newark, N. J.; JERSEY CITY STEEL WORKS, J. R. Thompson & Co., Jersey City, N. J.; GRANT LOCOMOTIVE WORKS, Paterson, N. J.; DELAMATER IRON WORKS, N. Y.; DELAWARE AND LACKAWANNA RAILROAD CO.

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Gouges of all lengths, and circles beveled inside or outside. Nail Sets, Scratch and Bolt Awls, Chisel Handles of all kinds. Orders filled promptly; generally same day as received.

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The best and handsomest locks in the market. The Case and Cap are made of malleable iron, and the shackle case hardened. Prices lower than on any other lock *with shoulder on shackle upon the market.*

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New Patent "X" Razor Strap.

PATENTED DECEMBER 23, 1873.

This Strap, designated on our List as Letter "X," is of novel construction—is elastic, pleasantly yielding to the razor—gives a keen fine edge—is made of superior stock—is furnished at a low price—**and gives universal satisfaction.**

☞ ITS PRICE SELLS IT. ☜

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Badger Place, Charlestown, Mass.

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Manufacturers of

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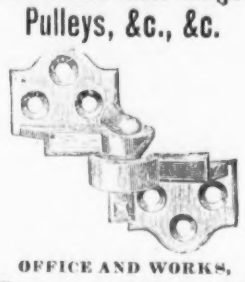
Patent Blind and Gate Hinges, Axle Pulleys, &c., &c.



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Cor. Terrace and Henry Streets,

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Send for our Illustrated Catalogue.

Olmstead's Late Improved Patent Double Seaming and Deflecting Machine.

The patentee of the above machine, after an experience of 15 years in the manufacture and sale of double-seamers and other tinners' tools, now offers to tinners this machine, which will double seam all kinds of straight, flaring and oval work, coffee pots, &c., &c. It works readily on the lightest and heaviest grades of tin plate and other sheet metal. It is strong and handsomely finished and is warranted. This is the best and cheapest seamer ever offered to tinners. For full particulars send for circular. Price only $25.

W. L. HEADLEY, Manufacturer,

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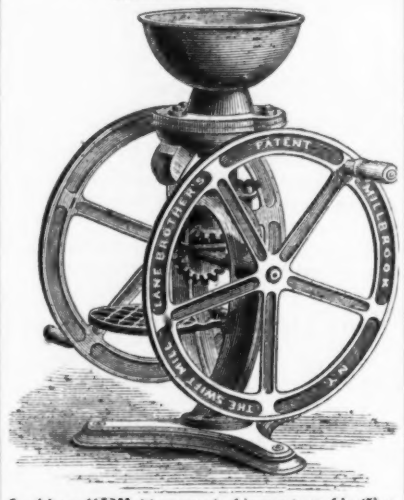
Also manufacturer of Olmstead's Combined Double Seamer, Setting Down and Deflecting Machine. Also Waugh's Circular Shears

The Swift Mill.

Established in 1845



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Stands nearly 2½ feet high. Is highly finished, color deep Vermilion and Gold. We make more than 30 different styles and sizes.

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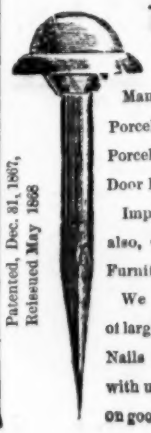
Factory, Nos. 252, 254 & 256 Pearl Street



Patented, Dec. 31, 1867, Released May 1868

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Manufacturers of Richards' Patent Porcelain-head Picture Nails; also, Porcelain Picture, Drawer, Shutter, and Door Knobs, etc., etc.

Importers of German Brass Goods, also, China, Gilt, Steel, and Silvere Furniture Nails Wire Nails etc,, etc.

We particularly invite the attention of large buyers to our Patent Picture Nails and Knobs being a specialty with us, we offer satisfactory discounts on good orders

Patent Laws.*

(Concluded.)

REISSUES AND DISCLAIMERS.

A reissue is for the purpose of correcting any unintentional mistake in either the specifications or drawings, or both.

The wording of the description and claim in a specification may be altered at will in a reissue, subject to the qualification that the reissued patent be for the same invention as the original.

It is not in the power of a patentee by a reissue of his patent to affect the rights of other parties to whom an interest in the whole or ap part of the patent has previously passed, without their consent.

Patents can only be reissued to cure defects which happened by accident, madvertance or mistake; and if defects were introduced designedly into the original patent, with fraudulent or deceptive intention, that destroys the right to a reissue.

A reissue does not in any manner extend the term for which a patent was originally granted, as the patent is only reissued for the unexpired part of the original term. One important consequence of a reissue is, that the patentee cannot, after reissue, recover any damages for infringement prior to reissue, for the old patent must be surrendered to procure a reissue, and all suits and causes of action for infringement die with the surrender.

When through accident or mistake a patentee has claimed more than that of which he was the original and first inventor or discoverer, his patent shall be valid for all that part that is justly and truly his own, and he may, on payment of the government fee of ten dollars, make disclaimer of such parts of the thing patented as he shall not choose to hold or to claim by virtue of the patent.

A disclaimer may be filed by the owner or owners of the whole patent, or the grantee of a sectional interest, and must state the interest in the patent held by the party disclaiming. If a party entitled to file a disclaimer unreasonably neglects or delays to do so when the same is necessary, his patent is void so far as his interest in it is concerned. The delay commences when knowledge of the need of a disclaimer is first brought home to a party entitled to file it. A disclaimer is, when filed, to be considered as a part of the specification, in considering the rights of the party filing it. It may strike out one or more clauses of claim, or it may modify all or a part of the claim, and when there is but a single clause of claim, it may modify that.

INTERFERENCES.

An interference is a proceeding instituted for the purpose of determining the question of priority of invention between two or more parties claiming the same patentable subject matter. An interference will be declared in the following cases:

1. When two or more parties have applications pending before the office at the same time, and their respective claims conflict in whole or in part. When two or more applications are pending at the same time, in each of which a like patentable invention is shown or described, but specifically claimed in all of them.

2. When an applicant having been rejected upon an unexpired patent, claims to have made the invention before the patentee.

3. When an applicant for a reissue embraces in his amended specifications any new or additional description of his invention, or enlarges his claim or makes a new one, and thereby includes therein anything which has been claimed or shown in any patent granted subsequent to the date of his original application, provided there is reason to suppose that such subsequent applicant or patentee may be the first inventor.

INFRINGEMENT.

It is an infringement of a patent to either *make* or *sell* or *use*, without legal permit, anything which forms the subject matter of any claim, or clause of claim, in a valid patent; for a patent conveys to the patentee the exclusive right to do *each* and *all* of these three things during the existence or life of the franchise The intent to infringe is not even necessary, and the patentee need not notify an infringer before bringing suit, for the patent is, in the

The sale of the *materials* of a patented machine, as such, and with no license, express or implied, to use the machine, as a machine, is no an infringement.

When a grantee of a territorial right under a patent sells the patented articles to another without any restrictions, such other person may take the article outside the grantee's territory and sell or use them, without he or the seller being liable as an infringer. To constitute an infringement, it is not always necessary that a person should technically infringe the claim. Where a party had a patent for a combination of a lamp burner and a lamp chimney, another party made and sold only the burner. The judge held such makers of the burners infringers. In this and similar cases the *intent* is of importance.

Suits for infringement can only be brought in the name of the owner or owners of the patent right for the district or territory where the infringement is committed. Licensees cannot bring suit in their own name.

Injunctions may be either perpetual or provisional. When a valid patent has been, in the judgment of the court, infringed, a perpetual injunction against the infringer is granted. A provisional injunction may be granted at the commencement, or during the progress, of a suit, as the judge in his sound discretion may decide, to restrain the defendant from infringing until the final determination of the case.

The rules by which the plaintiff's damages are to be computed vary somewhat according to the nature of the case. If the plaintiff relies upon the granting of licenses, wholly or mainly, to make his patent profitable, then the usual price of such a license will be taken as the damages to be found. In other cases the rule is to give the plaintiff such damages as will fully remunerate him for the loss caused him by the infringer.

EXTENSION.

An extension of a patent is granted if it shall appear to the satisfaction of the Commissioner of Patents that the patentee, without neglect or fault on his part, has failed to obtain from the use and sale of his invention or discovery a reasonable remuneration for the time, ingenuity and expense bestowed upon it, and the introduction of it into use; and that it is just and proper, having due regard to the public interest, that the term of the patent should be extended. If it should be so decided a certificate will be made renewing and extending the patent for the term of seven years from the expiration of the first term. An application for extension must be filed not more than six months nor less than ninety days before the expiration of the original term of the patent; no extension will be granted after the expiration of the original term.

The government fee upon the filing of an application for extension is fifty dollars, and fifty more upon the allowance, making in all one hundred dollars.

The intent of the law is, to grant extensions for the benefit of inventors or their heirs, and not for the benefit of mere assignees, and the extensions will be refused if it appears that the inventor has assigned or agreed to assign the same for nothing, or for a trifling consideration.

Patents of all kinds granted prior to March 2, 1861, are extensible, but patents, other than for designs, granted since that date are not extensible.

DESIGN PATENTS.

The statute of July 8th, 1870, enacts: "That any person who by his own industry, genius, efforts and expense, has invented or produced any new or original design for a manufacture, bust, statue, alto-relievo or base-relief, any new and original design for the printing of woolen, silk, cotton, or other fabrics," the same not having been known or used before his inventions or production, may obtain a patent therefor.

The Patent Office does not require that models shall accompany applications for design patents. Design patents are granted for three and a half years upon a fee of ten dollars, for seven years upon a fee of fifteen dollars, or for fourteen years upon a fee of thirty dollars, as the applicant *in his application* may elect.

* Abstract of Manual of patent Law by Wm. Edgar Simonds, of Hartford, Conn.

Protecting Cast Iron Pipes.

The water from mines frequently contains enough acid to attack cast iron pipes, destroying them in a short time. Oil colors and varnishes offer but a limited resistance, and the process of enamelling employed in Oberschlesia, says M. Englehardt, of Ibbenburen, although permanent and effective, is expensive. Cement is cheaper, and is not acted upon by these waters, and the only question to be settled was whether it would adhere to the smooth iron with sufficient firmness.

Two similar pieces of rolled iron were taken, and one of them painted over five times with a very thin cement, so that the coating was four or five millimetres thick. Both pieces were suspended near together in that part of the shaft where the water had attacked the signal cable most violently, and were left there four months. On taking them out, the unprotected iron was found to be reduced to one-third its original thickness; the other, in which a hole had been bored to suspend it, had suffered the same corrosion at the exposed portion; the cement covering was dark brown, but perfectly hard and unattacked by the acid. The cement was broken off, and the surface of the iron exhibited the dark blue color and lustre that it had on leaving the rolls.

As it is coating adhered so well to the smooth rolled iron, to which it cannot cling as tightly as to the rougher surface of cast iron, the experiment was continued on a larger scale. A 63 centimetre discharge pipe in the Oesthausen shaft was protected on the inside with cement. The coating remained unchanged for two years, while the pump was in constant operation. At the beginning of last winter the pump was stopped, and the pipe being no longer under water, the cement was so much injured by the frost that it scaled off. Several other experiments were made with similar results.

The pipes should be new, or if old, well cleaned from rust, before applying the cement, which is mixed as thin as is possible without injury to its tenacity. The pipe is moistened before the cement is applied, a thin coating of cement is put on and allowed to dry; when hard it is moistened and a second coating applied, and so on four or five times. The operation cannot be conducted so well in very hot weather, as the cement dries too quickly; nor must the pipes be exposed to frost during the operation or afterward. This unfortunate sensitiveness to cold may, perhaps, yet be overcome by intervening some semi-elastic material between the iron and cement.

Western Coal.—The St. Louis *Republican* says: "On both sides of the Mississippi, from Cairo up to a point not yet ascertained, the coal fields stretch out in almost illimitable productiveness; indeed, it is questionable whether we are richer in metal or carbon. The one is indispensable to the other, and our wealth in both is boundless. England has the one, but has worn out her supply of the other, and she must either purchase her coal or suffer her iron trade to leave her. In either event our coal fields in a brief time will make us masters of the field, and the red fires of the future Birminghams and Sheffields will dot the river banks from this to the mouth. There is another feature which connects itself with this directly, and that is, England may buy her coal of the West. It is not a wild idea to conceive that when the West shall procure appropriation for an improvement of the river which floats by us to the sea, that English ships may land their cargoes at the port of St. Louis and take back coal in ballast. While our vast mineral wealth will conduce to the development of our greatness as a nation, the importance of our boundless supply of coal should not be underestimated or undervalued."

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COMMON AND REFINED BAR IRON,
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Rod, Hoop, Band, Scroll, Horse Shoe, Angle and Tee Iron.
PIG IRON,
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Iron of all sizes and shapes made to order.

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Common and Refined Iron Rods, Hoops, Bands, Scrolls, Horse Shoe, Ovals, &c., &c.
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Orders filled from stock at lowest prices.

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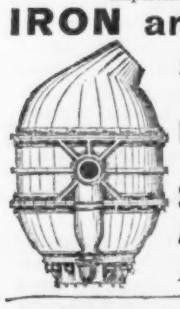
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Special Irons for Bridge and Architectural Work.

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A full assortment of all sizes constantly on hand.
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Of every description

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COMMON IRON,
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Sole Agents for the celebrated
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2½	"	115·00	" "
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Swedish Iron.
A Variety of Brands, including
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BARS suitable for Steel of all grades, Wire, Shovels, Hoes, Scythes, Carriage Bolts, Nail Rods, Tacks, &c.
CHARCOAL PIG IRON for Bessemer and Car Wheels.
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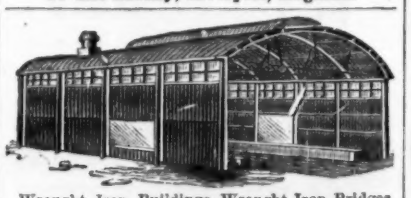
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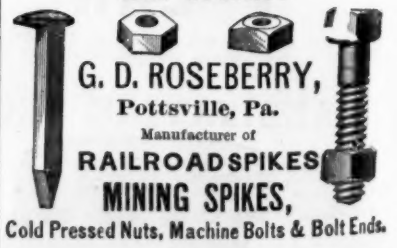
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New Patents.

We take from the records of the Patent Office at Washington the following specifications of certain patents lately issued, which will be found interesting:

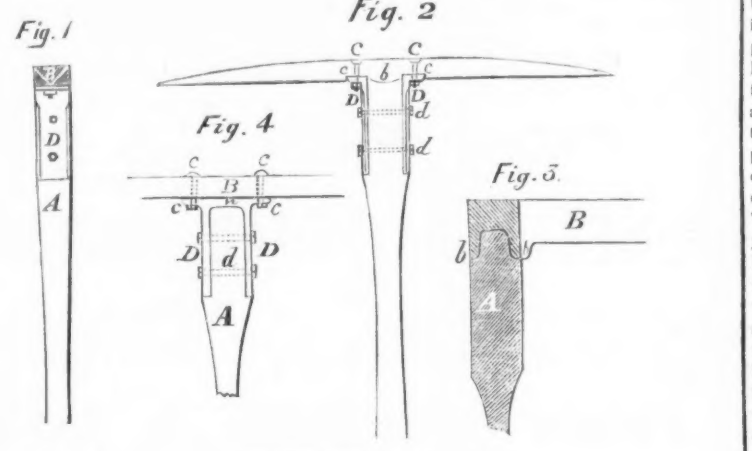
IMPROVEMENT IN HANDLES FOR PICKS.

Specification forming part of Letters Patent No. 148,038, dated March 3, 1874, issued to Thomas H. B. Correl, of Canton, Ohio.

This invention is designed to obviate the expense and difficulty attending the ordinary attachment of the handle to picks and mattocks by means of an eye forged in the pick; to which end it consists in securing an eyeless pick to the handle by means of two L-shaped irons bolted to the handle and pick, as is hereinafter more fully shown, thereby saving the expense of forging the eye, affording a protection to the handle at the end, and strengthening the handle and holding it securely from working loose while in use. Said invention also consists in the combination of a pair of lips or side pieces with the pick and end of handle, as is hereinafter more fully shown, by which the pick handle is prevented from splitting at the end from any side strains brought on it while in use.

In the accompanying drawing, Figures 1 and 2 are end and side views of a pick embodying my improvement. Fig. 3 is a cross section of said pick, taken through the handle. Fig. 4 is a side view of pick, showing a modified form of handle attachment.

A is the handle, which is ordinarily made of wood, in the general form shown. B is the pick or mattock, of any of the ordinary designs, but made without an eye. D D are the handle irons, made of an L form, and secured to the handle by bolts *d d*, running through said handle and iron. The upper ends *c c* of these irons are attached to the pick B by bolts C C, passing through said ends and holes drilled in said pick, as shown by dotted lines.



IMPROVED PICK HANDLE.

When the pick is to be used on very solid work, it may be found desirable to let the ends *c c* up into the pick B, as shown in Fig. 2, but this is usually unnecessary.

In order to prevent the handle A from splitting at the lower end, as it might do from the side strains from the bolts *d d* passing through it, in case the pick was twisted sidewise, punch into lower side of pick B, and draw down the lips *b b* as shown in Figs. 2 and 3, and then fit the end of the handle A between said lips, as shown in Fig. 3, thus securing said end from splitting open.

Fig. 4 shows a modified form of handle attachment, made of malleable iron and in one piece, the pieces D being made in a curved form in section, as shown in Fig. 4, and the two pieces D D being united by side flanges, which flanges serve the same purpose as the lips *b* in Fig. 2, the handle A fitting between them, as shown in Fig. 4. Bolts *d d* secure the piece D to the handle A, and bolts C unite the pick B to the ends *c*, as in the first form shown.

For ordinary heavy work, use the construction shown in Fig. 2, where, as in the last shown form, the pieces D may be made of a curved section to secure the handle A more firmly; and for lighter work, dispense with the lips *b*, or would use the attachment D *n* D (shown in Fig. 4), as this form could be made cheaply. It would save the work of drawing down the lips *b*, and, if made of good iron, would be of ample strength for all ordinary purposes.

Claim.—1. The attachment of a pick or mattock handle by means of two L irons placed between the handle and pick or mattock, and secured to each by through-bolts, substantially as and for the purpose herein specified.

2. The lips *b b* on the pick B, in combination with the handle A, secured between the irons D D, constructed as and for the purpose specified.

IMPROVEMENT IN THE MANUFACTURE OF IRON RESEMBLING SPIEGELEISEN.

Specification forming part of Letters Patent No. 153,698, issued to Edward Baker, of Millstone, N. J.

The quality of iron known as spiegeleisen has heretofore been produced in the United States from the residuum of the zinc ore of Sussex county, N. J., containing franklinite, after the ore has been treated for the production of white oxide of zinc, and such iron has also been produced from the residuum such as above stated, in admixture with iron ore, by a process secured by Letters Patent of the United States, bearing date June 10, 1873, and numbered 139,649.

Iron possessing the essential qualities of spiegeleisen can be produced of good quality from magnetic or other iron ores, when reduced in the ordinary blast furnace, in admixture with the slag or cinder as a flux and factor, which is obtained from the treatment, in a blast furnace, of the residuum of zinc ore, containing franklinite and free manganese, after the ore has been treated for white oxide of zinc, or obtained from the treatment of zinc or like ore, containing franklinite and free from manganese, in combination with iron ore; or, as the equivalent for such slag, manganesian limestone.

The analysis of such slag contains, on the average, the following, viz.:

Oxide of manganese	16·00
Lime	33·09
Magnesia	7·25
Silica (insoluble)	33·25
Oxide of iron, alum and phosphorus	10·40
	99·99

The iron ore and slag, such as above described, is used in about equal proportion, by weight, of iron ore and of slag, and these are mixed and treated in the ordinary blast furnace, as in the well-known process of reducing iron ore.

The proportions above stated have produced good results, the iron produced containing, on analysis, the following, viz.:

Metallic iron	84·23
Manganese	10·02
Carbon	2·55
Phosphorus	·22
Sulphur (a trace)	·00
Silicon	1·79
Chromium	·16
	98·97

Claim—The process, substantially as described, for producing iron possessing the essential qualities of spiegeleisen, by reducing, in the ordinary blast furnace, magnetic or other iron ores, in admixture with the slag or cinder obtained from the treatment, in a blast furnace, of the residuum of zinc ore containing franklinite and free manganese, or from the treatment of zinc or like ore containing franklinite and free manganese, in admixture with iron ore or the equivalent of such slag, substantially as described.

IMPROVEMENT IN ALLOYS OR ANTI-FRICTION METALS.

Specification forming part of Letters Patent No. 154,317, dated August 25, 1874, issued to Milton H. Campbell, of Syracuse, New York.

The purpose of this invention is to make an alloy of certain metals properly proportioned and united, as herein described.

Copper, spelter and aluminum, together with a small portion of silicon are used. The two latter metals would be too expensive for the purpose but for this method of obtaining and combining them with the other metals. For this purpose take a portion of yellow clay compound, generally of about twenty per centum of silex mixed with the clay.

To form a proper charge for a melting, mix one pound of dry clay, a pound and a half of prussiate of potash, and one pound of common salt together, and put in the bottom of a crucible. To this add thirty-three pounds of copper, and raise them to a proper heat to melt the copper. Then add, in the usual way known to metallurgists, twenty-seven and a half pounds of spelter, and just before casting add one and a half pounds of tin, which completes the alloy. These ingredients thus compounded produce the strong, tough anti-friction alloy desired for axle boxes and other purposes where applicable.

It is obvious that the proportions herein named can be somewhat varied within certain limits; for instance, a larger amount of clay can be added to increase the aluminum without detriment to the result; but the proportions named produce a metal sufficient for most purposes.

Claim.—1. The combination of metals herein described, and in the porportions substantially as and for the purposes set forth.

2. The admixture of aluminum and silicon with the other metals in the manner herein described, extracted directly from the ore in the crucible with the other metals, and melted in conjunction therewith, as specified.

Bursting an Experimental Boiler by Hydraulic Pressure.

A series of experiments is being conducted by the Manchester Steam Users' Association, at Mr. Beeley's works, Hyde Junction, with a view of determining by experiments, carried out on a large scale, the effect that cutting openings in the shells of cylindrical boilers has upon their strength. Sometimes these openings are introduced at the base of steam domes, and sometimes for carrying down take flues through the outer shell. In the French, or "elephant," boiler these openings are inherent at the connecting necks between the lower and upper cylinders. In order, therefore, to test the effect of these openings, a full sized boiler of the Lancashire type, having a diameter of 7 ft. in the shell, and 2 ft. 9 in. in the furnace tubes, has been constructed, and is now undergoing a series of tests, which it is intended to carry up to the bursting point to ascertain the ultimate resistance of the boiler. The first of these tests was made on Wednesday, the 9th inst., when the boiler had riveted to it a small wrought iron steam dome of the same size and strength as many of the connecting necks now in use in the French or "elephant," and others types of boiler. In preparation for this test the boiler was very carefully gauged in every direction, and six observers took measurements at various points of its movements under the gradually increasing pressure. It was found that the furnace tubes which were strengthened with flanged joints at each of the ring seams of rivets were quite immovable, which is satisfactory, insomuch as their sufficiency for high pressure was impugned at the recent explosion at Blackburn. The ends of the boiler breathed outward very slightly, and resumed their original position as nearly as may be on the pressure being relieved. The longitudinal seams in the outer shell exhibited no movement. The steam dome or neck, however, burst when the pressure reached 250 lb. on the square inch, showing that it formed the weakest part of the boiler. On the following day the boiler was again submitted to hydraulic pressure, the wrought iron steam dome having been removed, the opening blanked up, and a cast iron manhole of very substantial pattern applied. At a pressure of 200 lb. on the inch the cast iron mouthpiece ripped asunder, the rent extending right across the plate at each side, and into those adjoining. A wrought iron raised manhole mouthpiece, with which the boiler was fitted, resisted both tests without the slightest signs of distress, though repeatedly gauged. These tests show how weak those boilers must be in which manholes are altogether unguarded, while for high pressures, mouthpieces made of cast iron must give place to wrought, and also that the openings at the base of steam domes have a decidedly weakening effect, so that they should always be dispensed with wherever it is possible to do so. It is proposed to push the experiments still further under other conditions, so as to detect any weak points that may still lurk in the systems of construction now adopted for high pressure boilers of the Lancashire type. In addition to the above, a trial was made of the discharging power of a low water safety valve. The importance of an investigation on this subject was suggested by the recent explosion at Hull, which was attributed to the shortness of water, though the boiler was fitted with a low water safety valve. The experiments seem to show that the discharging power of these valves is not so high as it is desirable it should be, and that they will not reduce the pressure of the steam as rapidly as has been supposed, so that their construction requires further consideration at the hands of the makers. It is intended to extend the experiments on this subject to other low water safety valves of different constructions. When these investigations are finished, both as regards the strength of the boiler and the operations of the safety valves, the particulars will be given to the public in detail through the medium of the Association's monthly reports.

It may, perhaps, be of interest to state that the last letter Sir William Fairbairn, the late president of the Association, addressed to it shortly before his death, had reference to the boiler tests described above. He wrote warmly, approving the idea of the test, and urging that it should be made at once, and his letter shows how strong an interest he entertained to the last in the progress of the Association, of which he was one of the foremost founders and warmest supporters.—*Engineer.*

Philadelphia Dividends.

The 1st of October is one of the semi-annual periods at which many corporations pay their interest. The Camden and Atlantic Railroad Company will pay the interest on its second mortgage bonds, and also on the May's Landing and Egg Harbor City Railroad bonds. The Allegheny Valley Railroad pays the coupons maturing on its 7 per cent. bonds, the Camden and Amboy Railroad Company on its bonds of 1875 and 1894, the American Steamship Company on its bonds of 1896, and the Chartiers Railroad Company on its 7 per cents. of 1901. The coupons maturing on the Danville, Hazleton and Wilkesbarre Railroad first mortgage sevens of 1887 are bought by the Pennsylvania Railroad Company at that company's office. The interest due on the 5 per cent. perpetual loan of the Elmira and Williamsport Railroad Company is also paid at the office of the Pennsylvania Railroad Company. The coupons maturing on the first and third mortgage sevens of the Huntington and Broad Top Railroad are payable, and also the coupons of the second mortgage sixes of the Junction Railroad, the coupons on the third mortgage sixes of the Northern Central Railway Company, of the Mattel mortgage tens of the North Pennsylvania Railroad Company, on the second and on the general registered mortgage sixes of the Pennsylvania Railroad Company, on the Perkiomen Railroad first mortgage sixes of 1857, on the Philadelphia and Erie Railroad first mortgage sixes of 1881, on the Reading Railroad sevens of 1893, on the Reading Coal and Iron Company sevens of 1892, on the Sunbury and Erie Railroad sevens of 1877, on the West Jersey Railroad sevens of 1897, on the West Chester Railroad sevens, on the Wilmington and Reading Railroad first mortgage sevens of 1900, on the Morris Canal sixes and boat loan, and quarterly interest on the Lehigh Coal and Navigation Company sixes of 1884.

The 1st of October is also the interest period on the Sunbury and Lewistown Railroad sevens, and on the Western Pennsylvania Railroad sixes of 1893, but these have not paid regularly heretofore. The interest on the first mortgage bonds of the Oil Creek Railroad also fall due. Beside these interest payments, the following named will pay quarterly dividends during the month: The Camden and Amboy Railroad and the Philadelphia and Trenton Railroad on the 10th, the Lehigh Valley Railroad on the 15th, the Reading Railroad on the 23d, the Central Transportion Company, the Empire Transportation Company, the Southern Transportation Company, and the Franklin Fire Insurance Company.

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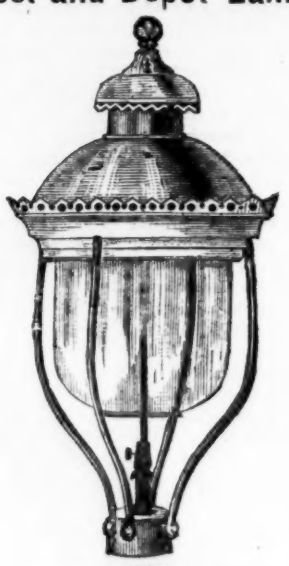

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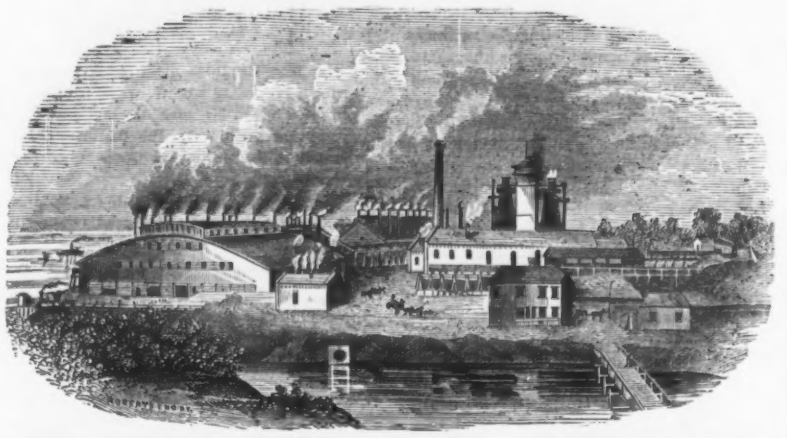

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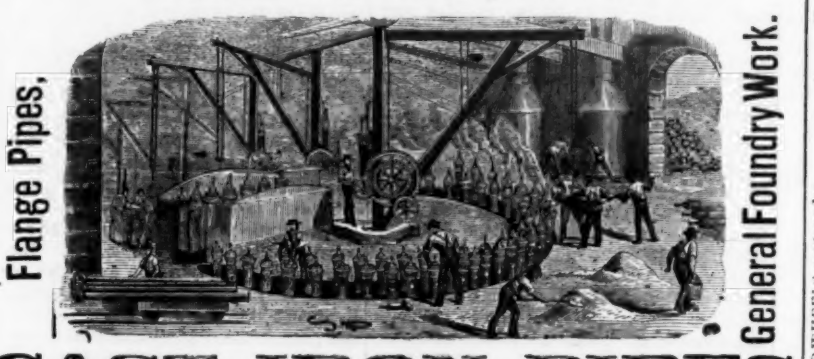

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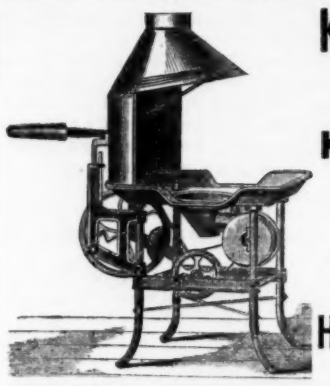

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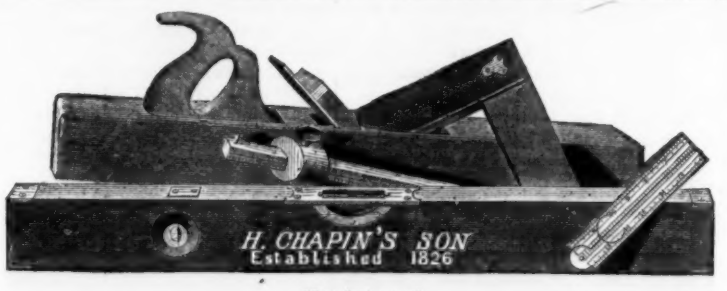

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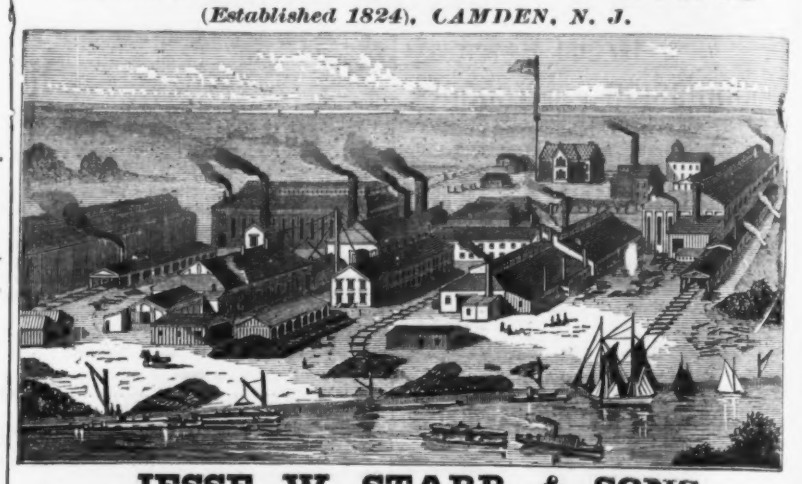

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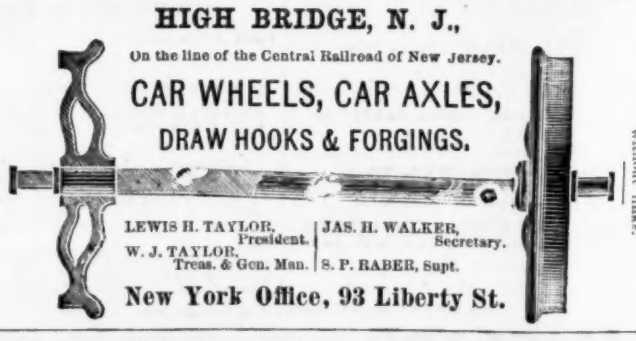

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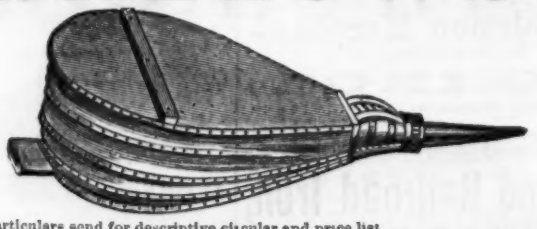

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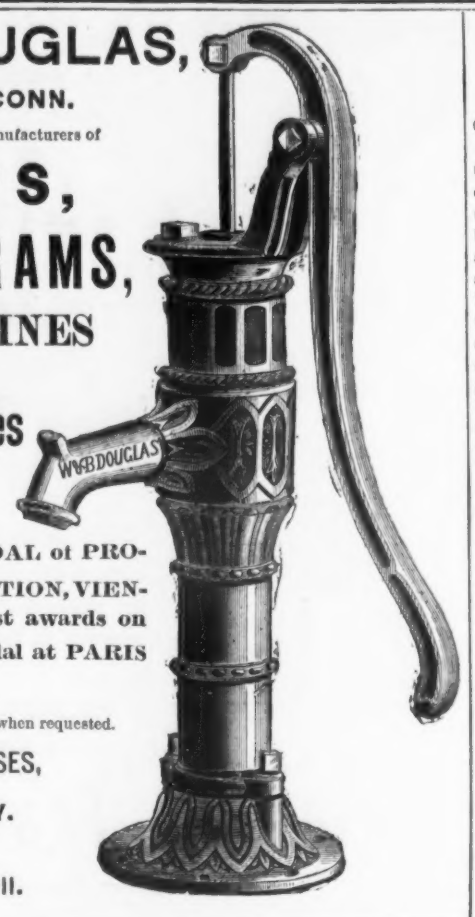

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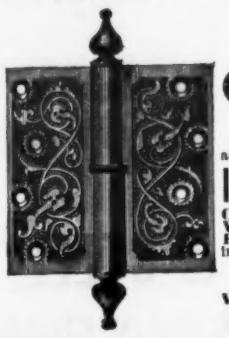

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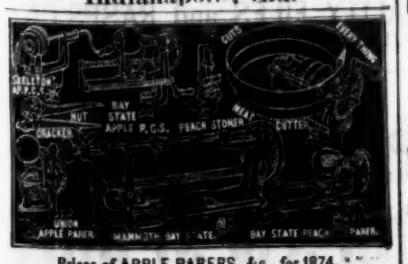

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On Some of the Properties of Iron.

BY PROF. TUNNER.

(Translated for *The Iron Age* by E. J. Hallock, A. M).

The properties of iron, so far as they relate to its use in the arts, are largely influenced by other substances like carbon, silicon, manganese, sulphur and phosphorus, which are combined with the iron. Since in many cases these accompanying substances injure the quality of an article so important to industry, the relation between iron and the substances which are introduced, whether intentionally or unintentionally, during its manufacture, has long been the subject of deep study by prominent metallurgists and chemists. In a lecture delivered by Prof. Tunner, in Steiermark, Jan. 31, 1874, the speaker mentioned a number of results obtained in the most recent experiments in reference to the metallurgy of iron, a few of which, on account of their great practical importance, we lay before our readers.

The different varieties of iron undergo changes which take place so slowly as not to be observed in short space of time, and hence most of them have remained entirely unnoticed, although they may attain a considerable importance, after a while, because of their continuous action. These changes take place in both the physical and chemical properties, as will be seen from the following examples: It is well known that iron which is worked cold becomes hard and brittle very rapidly, and hence in many cases, as in drawing wire, the work has to be stopped and the iron annealed. M. Rœmer, a director in Aumuhl, in Steiermark, has noticed the fact that wire immediately after it has passed the drawing iron will break when bent to a very obtuse angle, and that, after a few days, its brittleness is so much less that the wire could be bent to a right angle without breaking, and in a few weeks it had almost disappeared. It would not answer to substitute letting the wire lay instead of annealing for cold drawn wire, because on the one hand the former would require too much time, and on the other hand heating it improves it, rendering it softer and more easily bent, although less strong than it was originally. This much is, however, certain, that the greater strength which modern cold-rolled bar iron shows by experiments made with it has but little importance in practical use, because it is not permanent.

An interesting example of chemical change is given by Eggertz, director of the montanic section of the Polytechnic School, at Stockholm. He had in his collection of blast furnace products a piece of red-short iron, the quantity of sulphur in which was known; when analyzed afterward, less sulphur was found in it. Several years after the sulphur was again determined, and was found to have decreased still more. Prof. Ackermann states that in Swedish foundries it not seldom happens that cast iron, which contains sulphur, and which produces hot-short iron, will, after lying a long time in water, produce good bar iron. This fact is confirmed by Prof. Tunner's own experience, although he says that when much sulphur is present this method of desulphurizing will not suffice. He explains the phenomenon mentioned by supposing that when iron containing sulphur is placed in running water, or exposed to moist air, sulphureted hydrogen is evolved, which, as we know, is given out in large quantities at high temperatures, on granulating, and on sprinkling water on red-hot cast iron sand.

The relations of manganese to iron are very important. It has long been an established fact that manganese plays an important role in the different processes of iron working; heretofore only an indirect influence has been attributed to this body, namely, in this way, that it drove out other and injurious constituents like silicon and sulphur. Messrs. Siemens, and even before them, Prof. Mrazek, have recently proven that manganese exerts a direct influence. Prof. Mrazek, by his experimental researches on silicon and manganese in steel and bar iron, has proved that in the presence of silicon manganese does not render the steel more brittle (at least so long as the quantity is not more than sufficient to form a tetra carburet and tetra-silicate), but, on the contrary, that such manganous steel increases in malleability and strength, especially at high temperatures. Manganese acts energetically in removing the sulphur from iron by forming with it sulphuret of manganese, which goes into the slag. Manganese also assists the iron to take up carbon, forming white iron and spiegeleisen.

In order to introduce as much manganese as possible into cast iron, there is added to the blast furnace charge, if sufficient ore containing manganese is not to be had, some pyrolusite, corbelite, or other mineral rich in manganese. The heat in the blast furnace should be kept as high as possible, because manganese requires a relatively high temperature for its reduction; furthermore, the combining power of the silicic acid must be saturated as far as possible by other bases, that is, it must be worked with basic slag, because the protoxide of manganese, being a strong base, is well adapted to form silicates with the silicic acid. The Krainer Industrial Society have gone farther than any other in this direction in their blast furnaces at Janerburg and Sava, where they generally produce a spiegeleisen containing 9 to 10 per cent. manganese, but at the Vienna exhibition they exhibited specimens containing 20 per cent. or more.

A more disagreeable companion of iron is phosphorus, since it renders it cold short, and experience in making Bessemer steel has shown that it renders some sorts of cast iron utterly unfit for this use. So called burnt iron, although pure, is also cold short, and there is still a third cause of cold shortness, namely, the crystallization of the iron. In burnt iron the crystalline texture may be caused by high and long continued heating, and can easily be removed by moderate working at a somewhat higher temperature, while iron containing phosphorus, by slight heating, in a short time always becomes crystalline or cold short again. The perceptible cold shortness does not depend on the quantity of phosphorus alone, but also on the manner of heating and the mechanical manipulation that follows. The amount of injury done by the phosphorus has been found by experiment to depend on the manner in which the iron is made; puddle iron is least sensitive to it, malleable iron more so, and Bessemer steel most of all. Rails made of puddled iron are often good enough to use when they contain 0·4 per cent. of phosphorus, and with 0·25 per cent. are scarcely at all cold short, while Bessemer metal containing 0·1 per cent. phosphorus is bad. The cause of this difference in sensitiveness seems to be that Bessemer metal contains the least slag, puddled iron the most, and the intermingled slag renders the formation of a coarse, crystalline structure more or less difficult according to the quantity of slag present. The hardest steel is most sensitive to phosphorus, and should not contain more than 0·01 or 0·02 per cent. of it.

As phosphorus exerts such an injurious influence on iron, numerous experiments have been made to obtain crude iron free from phosphorus and fit for the Bessemer process from ores that contain phosphorus. Phosphorus occurs in nature not only in most ores and fluxes, but also in all vegetable and mineral fuels. In all the better kinds of fuel the quantity of phosphorus is so small that by careful selection all the practical conditions can be satisfied. In iron ores it is not possible to attain the end by selection, and since phosphoric acid cannot be roasted out, the solubility of phosphoric acid and the phosphates has been made use of for dephosphorizing iron ores by leaching them out. Strohmeyer, of Ilsede, has employed muriatic acid, Jacobi, at Kladno, has made experiments on a large scale with sulphurous acid. The experiments on leaching out do not seem as yet to have been a success from an economic point of view. Other experimenters have brought the cast iron, as it flows from the furnace, into contact with certain substances that expell the phosphorus. For this purpose Warmer, and afterward Henderson, employed fluor spar and pulverized siderite, and Heaton used saltpetre. This treatment of the ore expelled the phosphorus very successfully, but seemed impracticable because not economical on a large scale.

At present the phosphorus is separated practically only in refining the iron, the puddling furnace being the best for the purpose where all the conditions are favorable to the formation of a phosphate of the protoxide of iron, which goes into the slag. In rational puddling three fourths of the phosphorus in the cast iron is expelled.

There are numerous fluxes which have come into use for a more complete removal of the phosphorus, among which are the patented powders of Schafhautl, Scheerer, Schermann and Richter. Although the phosphorus cannot all be removed, fortunately in iron intended for ordinary uses, and in soft kinds of steel, like pen steel, it is not injurious, but rather an advantage, for, according to the experiments of K. Styffe, the phosphorus in iron increases its absolute strength, hardness and elasticity, diminishing only its malleability and ductility.

The Pacific Iron Works.

The Pacific Iron Works, says the San Francisco *Mining and Scientific Press*, is the oldest but one of the iron foundries on this coast. It was established in 1850 by Mr. Goddard, occupying the same location as at present, on First street, between Mission and Howard. The works occupy a space fronting 240 feet on First street and running back to Fremont street 275 feet. The proprietors for the past twelve years have been Ira P. Rankin and A. P. Brayton. The general superintendent is George W. Fogg.

The works have been completely refitted with new tools of the most approved character, capable of turning out all classes of work, and is one of the largest and best equipped shops on the coast. The shop is a very substantial three-story brick building, perhaps the best in the city. All the different departments of a first-class foundry are here, the pattern making, machine, foundry and boiler departments being completely equipped. On the average 200 men are employed. These works are peculiarly fitted for turning out heavy work of all descriptions.

In common with the other iron foundries of this city, work has been rather dull with them for the past three years, but the present year is a very busy one. Buildings, mills and hoisting works are on the increase, and all of a larger character than heretofore. No particular specialty of work is performed at this foundry except, perhaps, that they have turned out more marine work in the past ten years than the other foundries. They have fitted out a number of tugs, steamboats, etc., which are now running on the bays and rivers of the coast. They built one of the first compound engines ever made here for the steam tug Fearless, now running in Coos Bay, and which is performing its work well. They are also doing most of the repair work for the Pacific Mail Steamship Company.

These works have just shipped a fifteen-stamp mill for the Oakland Silver Mining Company, of Nevada, with pans, settlers, etc., complete. They have a large contract to furnish iron work for the Napa Insane Asylum. Also a contract for furnishing the iron work for the building of the Safe Deposit Company, on the corner of California and Montgomery streets. They have been quite busy building furnaces, retorts, etc., for various quicksilver companies. They built the large thirty-ton furnace for the Great Western quicksilver mine, and are just shipping a twenty-ton furnace to the Santa Cruz Company in San Luis Obispo county.

Glazier's Diamonds.

The ancients were ignorant of the art of cutting the diamond, and hence they used it in its natural granular crystallized state. Though probably known to the artists of Hindostan and China at a very early period, it was unknown to the Europeans during the middle ages, for the four large diamonds which ornament the clasp of the imperial mantle of Charlemagne—which is still preserved—are uncut octahedrical crystals. In 1456 Robert de Berghen, a native of Bruges, in the Netherlands, discovered that a diamond might be cut and polished by a powder made from itself, with the aid of certain iron wheels. Hence the well known adage of "diamond cut diamond."

The earliest mention of the diamond being used for writing on glass occurs in the sixteenth century, when the following lines, which may be considered as the first application of the diamond for this purpose, were written by Francis I. of France, with his diamond ring, on one of the panes of glass in the Castle of Champfort. The king's purpose in writing them was to intimate to Anne de Pisselew, Duchess of Estampes, that he was jealous of her:

Souvent femme varie
Mal habit qui s'y fie.

Woman is changeful as summer's sky,
'Tis folly to trust her constancy.

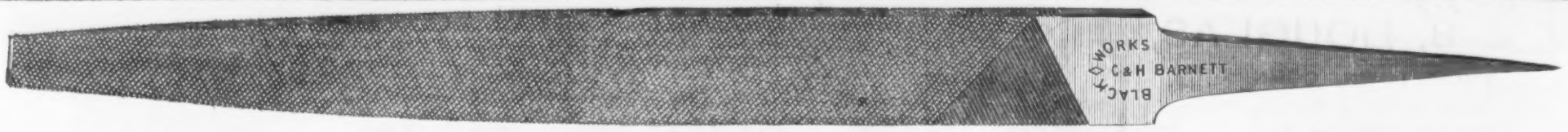
After this, but still before it came into the hands of the glazier, the diamond was successfully employed in etching or engraving figures on glass vessels; and some very beautiful specimens of this novel art were produced at Venice as early as 1562. The first noted professional engraver on glass with the diamond, of whom anything is known, was George Echwanhardt. In later times, John Rost, an artist of Augsburg, obtained great celebrity in this art. Two drinking glasses, curiously and elegantly ornamented by this artist with his diamond pencil were purchased by Charles VI. The art of cutting glass with a wheel, a method applicable to crystal only, was invented, in the beginning of the seventeenth century, by Caspar Lehmann, lapidary and glass cutter to the Emperor Rodolphus II.

A knowledge of the diamond, however, either for use or ornament, is not at all of remote antiquity, if we except a few instances where it was employed (but very inefficiently) for the latter purpose. This is accounted for by its requiring to be cut and polished before it exhibits any degree of that shining quality which so pre-eminently distinguishes it from other minerals. Until, therefore, the art of cutting was discovered (and that is not much more than three hundred years since), very little use could be made of it; as in its original rough state it is in no way attractive, being without lustre or beauty of color. Before its introduction as an agent in cutting glass, that operation was performed by means of emery, sharp-pointed instruments of the hardest steel, and sometimes hot iron.

The diamonds employed in glass cutting are of the description known by the technical name of bort, a classification which includes all such pieces as are too small to be cut, or are of a bad color, and consequently unfit for ornamental purposes. In considering the diamond in its relations to the purposes of the window glass cutter, there occur some circumstances worthy of remark. Among these may be noticed that the cutting point of the diamond must be a natural one; an artificial point, however perfectly well formed, will only scratch the glass, not cut it. The diamond of a ring, for instance, will not cut a pane, but merely mark it with rough superficial lines, which penetrate but a very little way inward. Artificial points, corners or angles, therefore, produced by cutting the diamond, are adapted for writing or drawing figures on glass. The cutting diamond does not write so well on glass, from the circumstance of its being apt to enter too deeply, and take too firm a hold of the surface, and thus become intractable. Further, an accidental point, produced by fracturing the diamond, is as unfit for cutting as an artificial one. Such a point will also merely scratch the glass. No point, in short, that is not given by the natural formation of the mineral, will answer the purposes of the window glass cutter. The large sparks, as the diamonds used for cutting glass are called, are generally preferred to the small ones, from the circumstance of their being likely to possess (although this is by no means invariably the case) a number of cutting points; while the very small sparks, for obvious reasons, are not always found to possess more than one. Thus, if the point of the latter is worn or broken off, although the spark be turned, and reset in its socket, it will still be without the power of cutting, and, consequently, useless; while the former, on undergoing the same operation, will present a new and effective point. The large sparks are called mother sparks, and are sometimes cut down into as many smaller fragments bearing the same name as there are natural points in the former. Each of these, therefore, can only have one cutting point, and are, consequently, only proportionately valuable to the glazier, since they cannot be restored by resetting.

The art in managing the diamond, in glass cutting, so as to produce effective results, can only be attained by considerable experience. The diamond must be held in a particular position, and with a particular inclination, otherwise it will not cut, and the slightest deviation from either renders an attempt to do so abortive. In the hands of an inexperienced person, it merely scratches the glass, leaving a long, rough furrow, but no fissure. The glazier judges by his ear of the cut made. When the cut is a clean and effective one the diamond produces, in the act of going along, a sharp, keen and equal sound. When the cut is not a good one this sound is harsh, grating and irregular. On perceiving this, the operator alters the inclination and position of his diamond, until the proper sound is emitted, when he proceeds with his cut.

Diamonds are found in the East Indies, Brazil, South America and the Island of Borneo.



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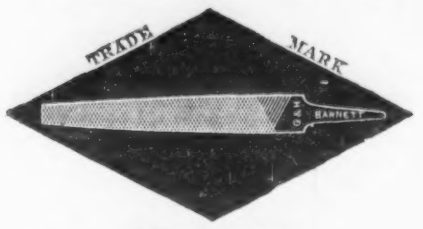

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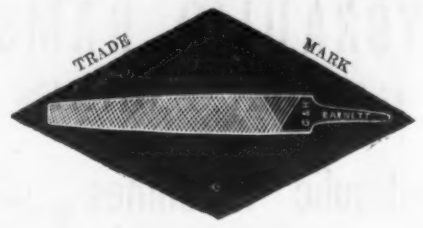

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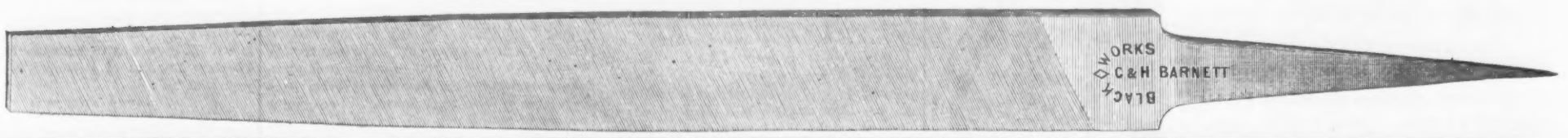


THE NICHOLSON FILE.

All Nicholson Files are cut with the Patent *Increment Cut*, an invention owned and controled exclusively by us, the file cut in this manner being Patented as a new article of manufacture, and differs from all other machine cut files (all of which have their teeth cut with equal spaces) by being cut with teeth slightly *expanding or increasing in size and space from the point*, thus avoiding the too great regularity of teeth common to all other machine cut files. The tendency of all cutting tools with teeth or cutters placed at regular distances from each other may be illustrated (to the machinist at least) by the fluted reamer—as it is well known that if a round reamer be made with (say 12) teeth whose spaces are equidistant, the hole reamed will *not* be round and smooth, but will approximate to a hexagon in shape. Whereas, if the same number of teeth be made of irregular distances, the hole reamed will be both round and smooth. The same is true of a file, hence the necessity of its having teeth at unequal distances, and to which we have applied the name of Increment Cut File, which possesses all the advantages of hand cut work, and the accuracy and uniformityof machine work. It is now upwards of seven years since this File was introduced to the public, and the demand has increased until our production is undoubtedly treble that of any File manufactory in the country.

We put all files under seven inches in boxes of either one-half or one dozen each. These boxes are neatly arranged, and open on the end, on which the kind is plainly marked with printed labels, acknowledged improvements on the old methods.

The "*Increment File*" is not an experiment, but an established fact, and already has acquired a legitimate demand for upwards of 500 dozen per day. We employ no *regular Travelers*, but our goods may now be found in the hands of the principal jobbers and dealers throughout the country.

Prices and terms will be forwarded on application to

NICHOLSON FILE COMPANY,
Providence, R. I.

USE THE BEST.

Pawtucket, R. I.

The American File Company have the exclusive right to use the Bernot process for cutting files By this method all the advantages of hand cutting are secured, together with an accuracy unattainable in hand work. They are the only manufacturers who employ machinery for testing files and steel.

Goods of all known manufacturers have been repeatedly tested, and interesting tables have been compiled showing the working qualities of files made by different makers, and of files made from different steels, and with various shapes and angles of tooth. They have thus reduced the manufacture of files to an exactness and perfection with a uniformity of result, as they believe, never before attained. No file, foreign or domestic, that they have ever tested, has equalled the performances of their own goods taken at random from their stock. Their machines are capable of the most delicate adjustment, and can produce the very finest work known to the trade. Special files made to order. Prominent file manufacturers are having their best goods from our works.

Price lists and information furnished on application.

AMERICAN FILE CO., Pawtucket, R. I.

FILES AND RASPS.

XTRA QUALITY,

MADE FROM THE BEST

IMPORTED STEEL

BY THE

Auburn File Works,

AUBURN, N. Y.

JOHN ROTHERY'S
Celebrated Hand-Cut FILES,

Made of Best English Cast Steel.

WALSH, COULTER & FLAGLER, Sole Agents,

83 Chambers and 65 Reade Streets, N. Y.

W. F. SHATTUCK & CO.,

113 Chambers and 95 Reade Street, New York.

MANUFACTURERS OF AMERICAN HARDWARE.

Coes & Tuft's Pat. Wrenches.
Axe, Pick, Sledge & Hammer Handles.
Hatchet, Auger, Chisel & File Handles.
Mallets. Pat. Boot Jacks.
Gimlets and Gimlet Bits.
Augers and Auger Bits.
Cocoa Nut Dippers.
Mouse Traps. Wire Selves.
Scale Beams.
Patent Tap Borers.
Tool Chests.
Climax Horse Collars.
Brundage Horse Nails.
Maguire's Wr't Iron Goods.
Shattuck's Platform Counter Scales.
Yaw's Cow Bells.
Axes, Picks and Hatchets.
Hammers. Crow Bars.
Sad Irons.
Boring Machines.
Cast Iron Hatchets.
Coffee Mills.
Star Steel spoons.
Stocks and Dies.

Leather Belting.

PAGE BELTING COMPANY.

Sole Manufacturers of

TRADE MARK.

Page's Patent Tanned Belting.

GENERAL MILL SUPPLIES.
No. 24 Exchange Street, Boston.

BRADFORD & SHARP,

Manufacturers of

LeatherBelting

OAK TANNED,

57 Walnut Street, Cincinnati, O.

We furnish many of the largest Iron Mills in the West, and guarantee quality of all goods sold.

Send for prices.

Alexander Brothers,

Manufacturers of **OAK TANNED**

LeatherBelting

410 & 412 North 3d, Philadelphia, Pa.

Established 1816.

Peter A. Frasse & Co.,

95 Fulton Street, New York,

SOLE AGENTS FOR

Thomas Turner & Co.'s Suffolk Works,

SHEFFIELD.

FILES AND HORSE RASPS,

And Importers of

P. S. STUBS' FILES, TOOLS & STEEL,

W. J. Davies' Sons' London Emery Cloth,

HUBERT'S FRENCH EMERY PAPER.

EVERY FILE WARRANTED.

Equal to the

BEST.

Western Files.

Western Files.

Works, Beaver Falls, Pa.

Office, 96 Chambers St., N.Y.

Western Files.

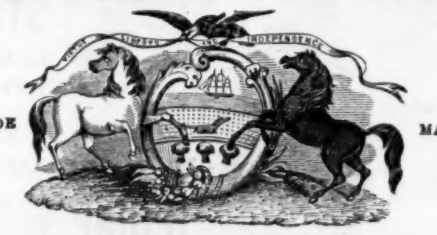
Western Files.

LARGEST CAPACITY

Of any File Works in the World.

In the face of strong prejudice against American files, this brand has earned a reputation second to none. The trade in all sections testify to their excellence. We confidently offer these files as superior in every respect and cheaper than any first-class file in the market. A trial will confirm their reputation.

PENNSYLVANIA FILE WORKS.

TRADE  MARK

McCAFFREY & BROTHER,

Manufacturers of FIRST QUALITY FILES and RASPS ONLY,

Nos. 1732 & 1734 North Fourth Street, Philadelphia, Pa.

GEORGE T. RICHARDSON. FRANK H. SCUDDER.

Middleboro' Shovel Co.,

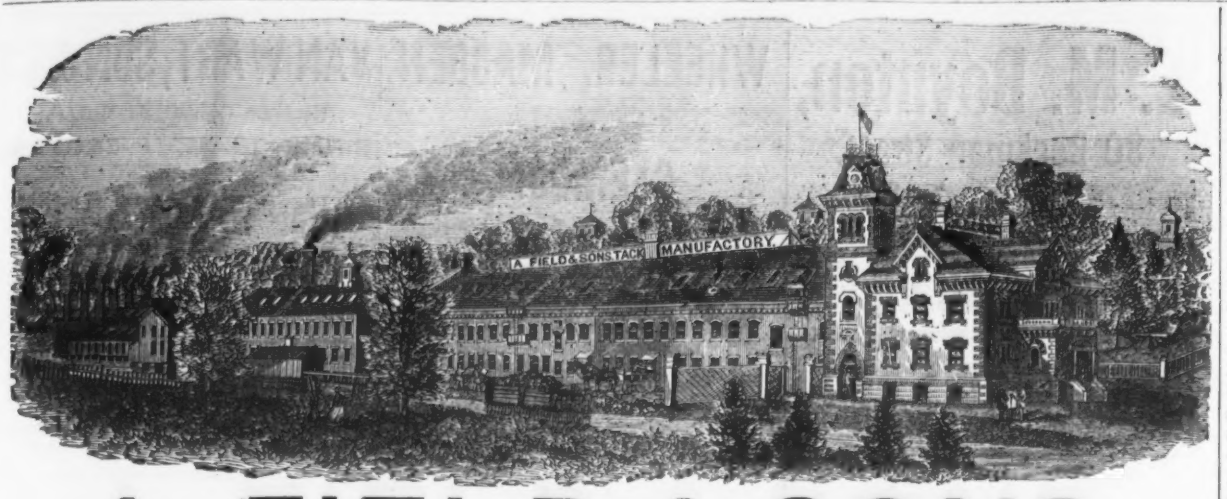
MANUFACTURERS OF

SHOVELS, SCOOPS & SPADES.

Office and Salesroom,

63 OLIVER STREET,

Works, Middleboro, Mass. **BOSTON.**



A. FIELD & SONS,

TAUNTON, MASS., Manufacturers of

Copper and Iron Tacks, Tinned Tacks,

SUPERIOR SWEDES IRON TACKS. for Upholsterers' Use, Saddlers' Supply, Card Clothing, etc., etc.

American and Swedes Iron Shoe Nails,

Zinc and teel Shoe Nails, Carpet, Brush and Gimp Tacks, Common and Patent Brads, Finishing Nails
Annealed Trunk and Clout Nails, Hob and Hungarian Nails,

Copper and Iron Boat Nails, Paten Copper Plated Tacks and Nails
Fine Two Penny and Three Penny Nails, Channel, Cigar Box and Chair Nails, Leathered Carpet Tacks,
Glaziers' Points, etc., etc.

OFFICES AND FACTORIES AT TAUNTON, MASS.

WAREHOUSE AT 35 CHAMBERS STREET, NEW YORK, where may be found a full assortment of Tacks, Brads, &c. for the accommodation of the New York Wholesale and Jobbing Trade.

☞ Any variations from the regular size or shape of the above named goods made from samples, to order. ☜

Hopkins & Dickinson Manufacturing Co.,

FINE METAL WORKERS,

69 DUANE STREET,

Works, DARLINGTON, New Jersey. **NEW YORK.**

HAND MADE LOCKS

AND REAL BRONZE HARDWARE.

New and Artistic Designs for Private Residences Banks, Churches and Public Buildings.

THE FINEST QUALITY OF BRONZE METAL IS USED IN ALL GOODS OF OUR MANUFACTURE.

We are the Sole Manufacturers of the Patent "Secure Self Bolting Sash Lock," represented in above cut, endorsed by all the leading Architects and Builders. It draws the sashes together, prevents rattling or warping, is easily applied, and cannot be opened from the outside, and is therefore positively Burglar Proof.

FERNALD & SISE,

100 Chambers Street, NEW YORK,

HARDWARE MANUFACTURERS' AGENTS,

REPRESENT

Reading Hardware Co.	Barnes & Deitz.	Underhill Edge Tool Co.
Crooke & Co.	Nashua Lock Co.	Plumb, Burdict & Barnard.
Yerkes & Plumb.	Arcade File Works.	Hotchkiss, Tuttle & Co.
Hartje, Wiley & Co.	William McNiece.	Klein, Logan & Co.
Vulcan Horse Nail Co.	Langstroth & Crane.	T. T. Rhodes.
Walsh & Bro.	B. Rowland & Co.	Orleans Scythe Stone Co.
Moran & Sons.	A. E. Young.	

Birmingham Shovel Co.,

Birmingham, Conn.,

Manufacturers of

LOWMAN'S PATENT CAST STEEL

SHOVELS, SPADES & SCOOPS

Of all Descriptions,

Without straps or rivets, of the best English and American Cast Steel. Every Shovel warranted. Printed lists of prices and discounts to be had on application at the office.

SOLE AGENT,

H. K. DRAKE, 31 Chambers St., N. Y.

OTIS PASSENGER —AND— FREIGHT ELEVATORS

FOR HOTELS, OFFICE BUILDINGS, STORES, WAREHOUSES, FACTORIES, MINES, BLAST FURNACES, &c.

OTIS BROTHERS & CO.

SOLE MANUFACTURERS,

348 Broadway, NewYork.

Licensed by United Nickel Company.

NEW YORK

Nickel Plating Co.

Works, 133 & 135 W. 25th Street,

Office, No. 18 Park Place,

ISAAC ADAMS, Jr., Prest NEW YORK.

Clement & Hawkes Mfg. Co.,

Manufacturers of

SHOVELS,

Planters' Hoes, Trowels and Machinery.

Northampton, Mass.

☞ Send for Circular and Price List.

BUSINESS ITEMS.

PENNSYLVANIA.

Messrs. Clarke, Reeves & Co., at the Phœnixville Bridge Works, have just completed what is probably the widest railroad bridge in the world, carrying 18 tracks. This bridge, which was built for the Philadelphia & Reading Road, crosses Richmond street in Philadelphia, is 64 feet span and 205 feet wide. A through span of 164 feet for a railroad with a sidewalk on one side has just been completed for the Phœnix Iron Company's new rolling mill. There are now under contract the Ticonic Falls Bridge for the Maine Central, three spans of 172 feet each and one of 114 feet; three spans of 255 feet each for the Susquehanna Bridge; two through spans (for double track) of 140 each and one double track deck span of 56 feet for the Philadelphia, Wilmington & Baltimore; the Copa Viaduct for the Lima & Oroya Railroad, in Peru, which is to have five 30-feet spans and one of 125 feet, the hight of columns being 50 feet, 16 girder spans and 4 deck spans of 44 feet each, also for the Lima & Oroya. All this work is now in progress.

The Harrisburg Foundry and Machine Shops recently tested the operation of making coal from anthracite dust, under a process and by aid of a machine recently invented. The experiment proved that what is usually considered waste can be utilized, and the coal dust turned into fuel.

The Keystone Bridge Works are working full handed, and evenings. The works never had more orders. They are now engaged on a large five span bridge for Trenton, N. J.

The Lehigh Valley Iron Company have sunk four shafts on the Lehigh Mountain, at Zionsville, each of which is 300 feet long, and ends at a depth of 100 feet below the surface, in a magnetic vein of ore, 14 feet thick. The ore taken from these mines amounts to about 800 tons per month, and is considered the best ore in Pennsylvania.

Wm. Kauffman & Co.'s new furnace, at Lebanon, which was commenced last April, is now nearly completed, and will be 60 feet high and 16 feet across the boshes. Messrs. Weimer & Birkinbine, of that place, constructed all the machinery and iron work, with the exception of the boilers, which were made at Reading by Messrs. J. Obert and Reazor & McCoy.

The Lehigh Car Works, at Stemton, have been building some pig iron cars for the Lehigh Valley Road.

After a stoppage since the 1st of August, the Pittsburgh Forge and Iron Company have now their usual annual repairs completed, and are now working full single turn.

The Allentown Iron Company have stored 15,000 tons of pig iron, the Lehigh Valley 3000, the Lehigh 5600 and the Roberts from 6000 to 8000.

CONNECTICUT.

The real estate of the Sharp Rifle Company, at Hartford, was purchased a few months ago by the Weed Sewing Machine Company, and last week Mr. H. W. Wescott, of the Adams Express Company, purchased from the trustees the machinery, stock, patents and other personal property for $30,000.

The Birmingham Optical and Needle Company have been putting up an addition to the brick building, for the purpose of making their wire for needles, and other purposes connected with their business. The Birmingham Shovel Company have begun to send off large quantities of their shovels.

There is no lack of business at the Malleable Iron Company's Works, at Meriden. Part of the help have been working nights for some time past, and will continue to do so until the present rush of orders is over.

A sugar mill, to go to Cuba, has just been completed by the Farrel Foundry and Machine Company, of Ansonia, which will soon be forwarded to its destination.

A joint stock company has been formed at Ansonia for the manufacture of brass faucets and other plumbers' brass goods, in which R. R. Colburn is the heaviest stockholder.

MASSACHUSETTS.

The Richmond Iron Company have dismissed nearly all the workmen in their mines, and nearly entirely suspended business in consequence of the lack of demand in the market for iron.

The Belcher & Taylor Agricultural Tool Company, at Chicopee Falls, received the diploma at the New England Fair for the best tobacco ridger and potato coverer.

VERMONT.

The Fairbanks Scale Company, at St. Johnsbury, are having an excellent run of business. In one week recently they manufactured eight hundred scales, including seventy-eight large hay, stock and railroad scales, which, considering the present stagnation in business generally, is highly satisfactory to the company.

RHODE ISLAND.

Thomas Wyatt contributes a good many of the links which bind the manufacturing interests of Providence into a prosperous whole. He manufactures chains of all kinds—cable chains, marine railway chains, brake chains, &c. These are all made by hand, of the best material, and are celebrated for superior workmanship. He also manufactures cotton case rings of the latest patterns, and does forging for all kinds of machinery. In a business career of a quarter of a century, Mr. Wyatt has built up an enviable reputation, which he spares no pains to maintain. His factory, at 771 Eddy street, is thoroughly fitted with all the machinery and appliances needed for his business, and gives constant employment to 15 skilled workmen.

OHIO.

Brown, Bonnell & Co., of Youngstown, made 28,500 tons of pig metal in 1873, which was worked up in the mills, producing about 25,000 tons of finished iron, nails and spikes, worth in market about $2,000,000. The monthly pay roll of the company, including miners' pay, is about $60,000. They give employment to about 1600 men and boys, exclusive of the miners.

The Columbus Car and Car Wheel Works are running on orders, with about 150 men employed.

The Cleveland Tube Works, of Scovill & Chase, at Cleveland, make boiler tubes and iron pipe. The shops cover an area of about 450 by 160 feet, with improved machinery, and they have a working force of 75 hands. A new furnace has just been added.

The King Iron Bridge Company, at Cleveland, have about 175 men in the shops, beside the outside force. They have built this year 134 bridges.

WISCONSIN.

The Reliance Iron Works, of E. P. Allis & Co., Milwaukee, cover an area of five acres, and give employment to 400 hands; 15,000 tons of iron, 2000 tons of coke, 2000 bushels of charcoal, 1800 tons of hard coal, and a large quantity of lumber are annually used. They have the contract for supplying the pipes for the Milwaukee water works.

KANSAS.

The Chicago Zinc Works, in Cherokee county, afford employment to over 250 men, beside giving work to a number of teams. About 8000 pounds of zinc are turned out every 24 hours.

The Glasgow Port Washington Iron Works.

A company organized in Scotland about two and a half years ago, under the name of the Glasgow Port Washington Iron Company, limited, to build a furnace in Tuscarawas county, Ohio, for the smelting of the Blackband ores of that State, is now in successful operation. Two blast furnaces have been erected, the site chosen for the works being about 2½ miles from the town of Fort Washington, and near to Newcomerstown, which is about 100 miles west of the city of Pittsburgh. There is easy access to the Ohio State Canal, which connects Lake Erie and the Ohio River, and by means of the Pittsburgh, Cincinnati and St. Louis Railway, there is direct communication with New York and other important cities and towns. Although the works are situated in America, the notion aimed at is to make, what may almost be called, Scotch pig, such iron as American founders and engineers have long prized. It is Scotch capitalists who have provided the wherewithal, and the heads of departments at the works almost universally hail from Scotland. Indeed, the works have already been designated by the native residents as the "Scotch Works," and they are spoken of as being both costly and magnificent. The manufacture of the necessary bricks for the various structures began only a year ago, and now there are in full operation two very fine blast furnaces, 76 feet high and 17½ feet in diameter at the boshes. About two and a half million bricks have been employed in building the furnaces, engine house, and the other necessary structures. The furnaces are close-topped, and are wrought on the bell and cone system, which is now so extensively and successfully employed in the Cleveland district. Blast is provided by a pair of splendid engines, the blowing cylinder of which is 84 inches in diameter. They were supplied by the eminent firm of M'Intosh, Hemphill & Co., Pittsburgh, and erected under the superintendence of Mr. John Stevenson, Jr., late of Glasgow, a young gentleman whose skill as an engineer has warranted the company in retaining his services as their mechanical overseer. Steam is supplied by two batteries of four boilers each, and the water is obtained from the Ohio Canal, from which it is conveyed a distance of about a mile to its destination. A huge reservoir, capable of containing about 125,000 gallons of water is erected at the furnaces There is also a large frame structure, whose foundation is 18 feet below the railway track, and into which the coke brought from Connellsville, Pennsylvania, is emptied from the wagons for use in the furnaces. In the meantime, a mixture of coke and raw coal is used in the furnaces, but it is hoped that in the course of time raw coal alone will suffice. The company's representatives at the works are experimenting in the manufacture of coke from the coal obtained at Port Washington, and they are succeeding in that respect beyond their most sanguine anticipations. They are also manufacturing fire bricks for use at the works, erecting lime-kilns, &c. It should be mentioned that the company own about twelve acres of limestone land near the Cadiz Branch Railroad. The probable cost of the works already brought into operation is about 750,000 dollars, exclusive of the land. Including the people employed in the mines, quarries, saw mill, &c., and at the furnaces, there are between two and three hundred persons in the service of the company.

The chairman of the company is Mr. James Reid Stewart, Glasgow; and at the works, beside Mr. Rennie, there are Mr. Andrew Crookston, chief engineer; Mr. Alexander Fleming, furnace engineer; Mr. John Fleming, founder; Mr. Coats, mechanical engineer; and Mr. John Stevenson, Jr.

There is every reason to believe that this new enterprise has before it a prosperous career. There are in all about 860 acres of mineral lands owned by the company, in which there are extensive and valuable deposits of blackband, clayband and ball ironstone, coal, clay and building stone. The seam of blackband ironstone ranges from 3 to 10 feet in thickness, and the quantity is believed to amount to fully three and a half million tons; while the seams of coal are five in number, and vary from 2½ to 8 feet in thickness. The minerals crop out at the surface, and can be wrought on the "open-cast" system. It is calculated that the ironstone in the two properties acquired by the company will last, working with two furnaces, for forty years.

GEORGE GUEUTAL & SON,

39 West 4th St., New York.

IMPORTER OF

Wood Screws, Steel in Sheets,

BAND SAWS, TOOLS FOR BRAZING, &c.

Bed Screws, Pin Hinges, and Wire Nails a Specialty.

H. W. PEACE,

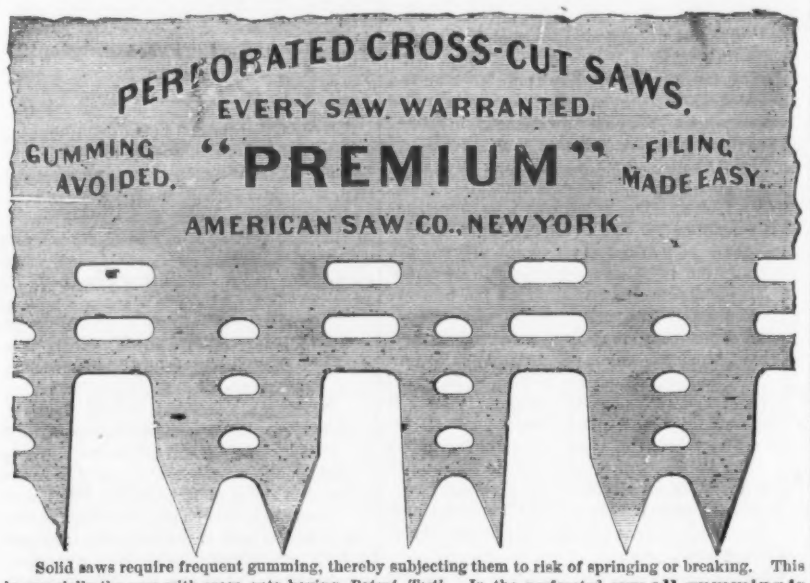
MANUFACTURER OF

SAWS OF ALL KINDS.

FACTORY, WILLIAMSBURGH, N. Y.

AMERICAN SAW CO.,

TRENTON, NEW JERSEY.

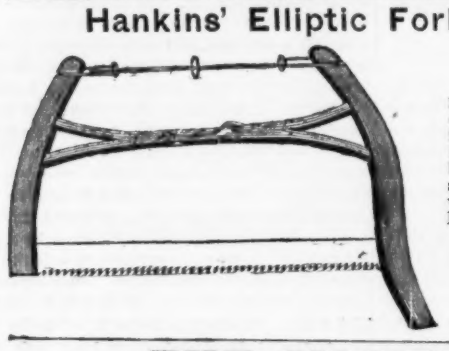


Solid saws require frequent gumming, thereby subjecting them to risk of springing or breaking. This is especially the case with cross cuts having *Patent Teeth*. In the perforated saws **all gumming is avoided** and the teeth are easily kept long and in *proper shape*, saving *files*, *labor*, *expense* and *vexation* As is well known, our saws cut faster, smoother and easier than any other.

MOVABLE-TOOTHED CIRCULAR SAWS AND SOLID SAWS OF ALL KINDS.

Hankins' Elliptic Forked Saw Frame.

Patented June 28th, 1870.



The annexed engraving represents HANKINS' ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Brace being all in one piece, without any center bolt, secures for the Frame great strength and durability. These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace."

HARVEY W. PEACE,

VULCAN SAW WORKS,

WILLIAMSBURGH, N. Y

THE SILVER STEEL

DIAMOND CROSS-CUT SAW.

$1.50 Per Foot.

Patent Secured

PATENT HANDLES AND GAUGE INCLUDED.

THIS new Saw, which is destined to take the place of all Cross-cut Saws in point of **SPEED AND EASE**, is manufactured by **E. C. ATKINS & CO., Indianapolis, Ind.**, who are the

SOLE MANUFACTURERS FOR THE UNITED STATES.

So confident are we that this is the best Cross-cut Saw in the market that we CHALLENGE THE WORLD. Orders promptly filled.

E. C. ATKINS. H. KNIPPENBERG.

E. C. ATKINS & CO.

Saw Manufacturers and Repairers, Indianapolis, Ind.

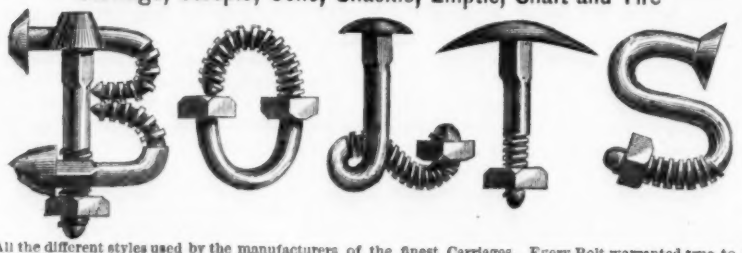
R. E. NEIL, President. H. A. LANMAN, Treas. & Manager. F. G. WADDEL, Secretary.

COLUMBUS BOLT WORKS,

COLUMBUS, OHIO,

Manufacturers of BEST NORWAY IRON

Carriage, Steeple, Cone, Shackle, Elliptic, Shaft and Tire

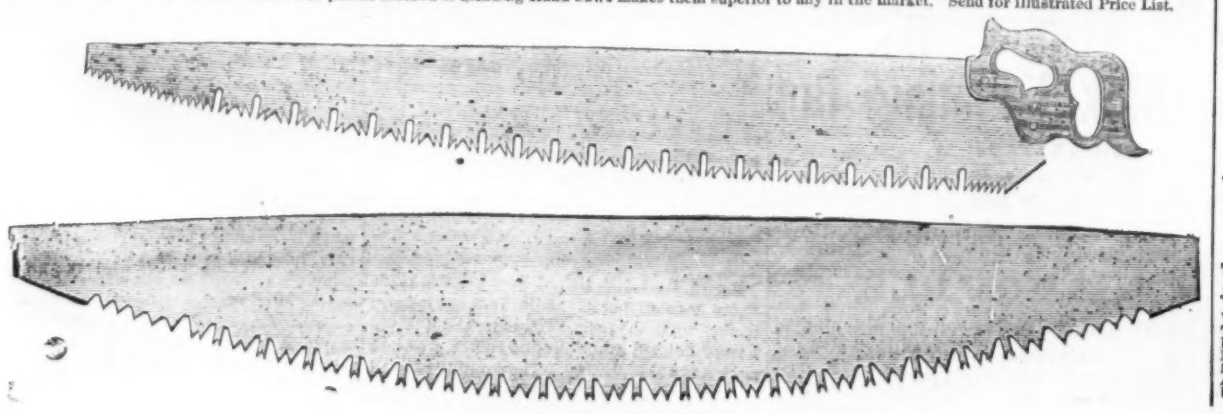


All the different styles used by the manufacturers of the finest Carriages. Every Bolt warranted true to size and fit. Illustrated Price Lists mailed on application. Our facilities are unsurpassed for the manufacture of **Machine Bolts and Coach Screws.** Correspondence from Car, Bridge and Machinery Builders solicited.

J. FLINT & CO.,

Manufacturers of all kinds of SAWS and PLASTERING TROWELS, Rochester, N. Y.

A large Stock of **Cross Cut Saws** constantly on hand. Orders filled promptly. **Dietrich's Double Handle One Man Cross Cut Saw** made with any kind of tooth desired. Our patent method of grinding Hand Saws makes them superior to any in the market. Send for illustrated Price List.



E. M. Boynton,

80 Beekman Street,

NEW YORK,

Manufacturer of

Saws of all kinds.

Also Sole Manufacturer of

LIGHTNING SAWS.

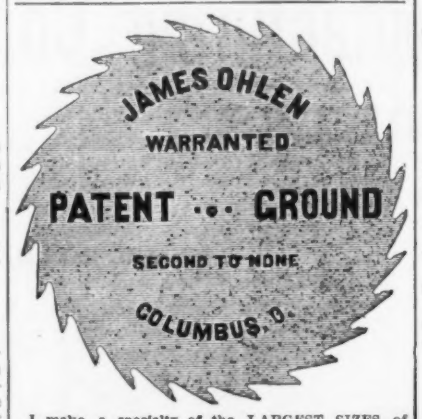
Two Direct Cutting Edges, instead of one Scraping point.

Note extra steel and durability over the old **V**, outlined on **M** tooth.

I am willing and extremely anxious, on proper notice, to accept a Challenge from H. Disston & Sons, or any responsible Saw Manufacturer, and am ready to back my words with appropriate deeds and $500 expense, if beaten.

N. B.---With Hand, Billet or Cross Cut Saw, $500 on each.

E. M. BOYNTON.



I make a specialty of the LARGEST SIZES of **Circular Saws**, and call particular attention of lumber manufacturers to the following points of excellence:

Evenness of Temper.—The peculiar structure of my furnace subjects all parts of the saw to a DEAD heat, and when dipped in the oil bath secures perfect uniformity.

Perfect Accuracy in Thickness.—My saws are ground on a patent machine, automatic in its operation, grinding off the thick places upon the plate before the thinner parts are reached, and when the saw is removed BALANCES PERFECTLY, which is proof positive of the right accomplishment of the work.

Properly Hammered.—Great care is taken that no saw shall leave my works without due attention in this important particular. A saw too tightly strained upon the rim, or too loose in the center, cannot be successfully run—hence the importance of so hammering the saw as to effect equal strain in all its parts, and at the same time RUN TRUE. This department is under the personal supervision of myself, who has devoted over *twenty years* to the art of saw making.

I am sole proprietor and manufacturer of the celebrated **"Challenge" Cross-Cut Saw.** Price Lists of all kinds of saws sent on application.

JAMES OHLEN.

LIST OF HARDWARE DEALERS.

Having compiled a complete list of the **Hardware Dealers** in the United States, expressly for addressing circulars, I am prepared to receive orders for addressing **ENVELOPES, CIRCULARS, &c.** The printed address is cut from the list and stamped upon the envelope or wrapper, thus enabling me to address a great number in a short space of time, and at rates far below the prices usually paid for this work It answers all purposes, and can be done for one-third the expense of addressing by hand. My list contains names of over 4000 dealers, each State, city and town therein, being compiled separately. Wholesale Dealers and Manufacturing Co.'s, whose custom it is to send out circulars, price lists, &c., to the trade throughout the States cannot fail to find my list and style of addressing a great advantage to them, as it is a great saving of both time and expense. It has been tried by a large number in the trade, some of whose names appear at the bottom or this circular and to any of whom I would most respectfully refer. My rate for addressing is $2·50 per M. Envelopes, &c., sent to the address below, will receive prompt attention, and will be addressed and returned at once, or envelopes, &c., will be furnished at market prices. For further information, address,

CHAS. H. SMITH, No. 115 Broad St., N. Y.

REFERENCES.

Union Nut Co., 78 Beekman St., L Boardman & Son, 82 Chambers St., Millers Falls Co., 78 Beekman St., E. M Boynton, 80 Beekman St., Yale Lock Mfg. Co., N. Y.

P. S.—Copies of my list will be forwarded to any address throughout the U. S. upon receipt of $3·50.

NEW YORK, February 26, 1874.

WHEELER, MADDEN & CLEMSON,

Manufacturers of Warranted Cast Steel

SAWS

of every description, including

Circular, Shingle, Cross Cut, Mill, Hand, Roberts' and other Wood Saws, &c., &c

Cast Steel Files

of the well known brand of

Wheeler, Madden & Clemson.

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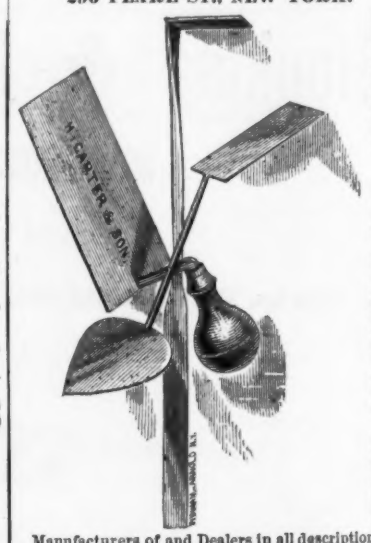

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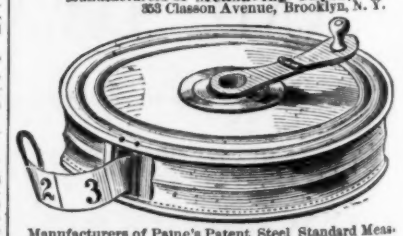

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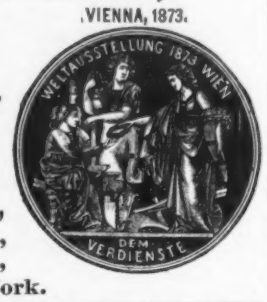

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IMPORTERS & JOBBERS.

PHILADELPHIA CORRESPONDENCE.

PHILADELPHIA, Oct. 5, 1874.

There has been somewhat of an improvement in the near-by trade of this city for the past week, and especially in the retail branches, which is encouraging to wholesale dealers in all lines. The iron trade will feel this, in common with all others, and, indeed, has already in some branches. The bar mills have more orders than for some time past, while both sheet and plate mills have a very fair trade. The Bessemer works, also, to judge by the constant reports of increased conversion of iron, seem to have a place for their product.

It is strange to note the different aspects in which the same action upon the part of producers is viewed by the public from different standpoints of interest. Thus, while the press of this country very generally recognizes the action of the cotton manufacturers in curtailing their production one-third as legitimate and proper, the same journals very curiously excecrate the Grangers for withholding the shipments of grain when prices afford them no profit. By a strange blindness of interest it seems impossible to see that the whole fabric of business is composed, of necessity, of intense self-interest and competition. Nevertheless, the tendency of the present generation to ignore the laws of supply and demand, and compel profit by combination, must ultimately receive its own punishment, as it always has. A sensible writer, who notices this growing effort to teach the sophism that the fewer the articles produced the richer the maker, while the country is being impoverished, wisely says:

"Combination ignores the use of brains, and forces production, prices and business to submit to the arbitrary edicts and regulation of associations of corporations and men. The history of the world shows that neither men nor associations of men can be safely trusted with such vast powers. With honest and fair intentions, they will pass over a boundary not obtrusive in itself, 'and easily hidden by the interposition of a selfish interest between it and the eye.' These combinations are the quintessence of monopoly—monopolies of the worst and most dangerous character, being no more and no less than conspiracies against the welfare of the people for the benefit of the few. Their tendency is to concentrate wealth in a few hands; to destroy liberty of action; to produce 'corners' in necessary commodities. Indeed, they are a species of social producing, commercial and financial engines, utterly destitute of morals, and as remorseless as the icebergs. They profess to have the public good at heart, but their only motive is profit and self. Whenever the contrivers of this machinery get hurt in its manipulations, nobody cries with pain except the operator; he gets no sympathy in compensation, but rebuffs from an outraged community. When the system explodes, as it certainly will, as all other false systems have, its projectors will receive the execrations of the people, and be treated as conspirators against the general welfare."

The feature of the week has been the approaching opening of the Franklin Institute Exhibition, which will have taken place before this is in print. The only mistake made in the affair has been in fearing a lack of interest upon the part of our manufactures. So far from the real truth was this, that at least double the space at hand could be filled if afforded. This total space reaches 91,000 feet, and even yet it is said 500 applications have been denied from want of room. The machinery will be all on the west side of the building, and is nearly all in place. The power will be furnished through two lines of shafting—one driven at 240 revolutions a minute by an 100 horse-power engine of vertical pattern, from Andrews & Watson; the other at 120 revolutions, by a 40 horse-power engine of Neafie & Levy's make. Among the curiosities in machinery will be a Shaw propeller pump in operation, and a mine pump discharging 700 gallons a minute. There is also a Neafie & Levy engine driving a steamship propeller. The catalogue of steam engines, vertical and horizontal, simple and compound, stationary, locomotive and marine, is very full. The machine tools comprise those of the best systems of Sellers and Bement, with others of good make from all sections of the country. Numerous trades will be represented in practical operation, among which, as a curiosity, will be the whole process of photo-lithography at work. The display of minerals will be especially fine, including anthracite and bituminosus coals, iron and other ores, alum, of which there is a block weighing 4½ tons, &c., &c. Looms and cotton machinery, a sugar refinery on a small scale in operation, the endless variety of sewing machines, and, indeed, every possible labor saving machine in use in the country. Iron and steel will be well represented, both in raw and manufactured articles. The metal worker will find an attractive display of heroic bronzes from Robert Wood & Co., prominent among which is the statue of Gen. Blanco, of Venezuela, the modeling of which I described months ago, and which is just finished. The art display contains some great curiosities of foreign art, as well as celebrities of American production. In short, every branch of manufactures in this great manufacturing center will be represented, while in competition will be the same products from other cities. The exhibition will do a good work in preparing competitors for the Centennial, and be of great importance to our city manufacturers.

The special meeting of the stockholders of the Pennsylvania Railroad Company, to receive and act upon the report of the Investigating Committee, lately reviewed in your columns, was held on the 3d instant. After organization, action in the report was deferred until the annual meeting at the request of President Scott, who explained his object to be that the foreign shareholders should have time to receive and examine the report, and that he had already received numerous requests to this effect from abroad. A resolution of thanks to the committee for their services was adopted, and the following tribute to the late John Edgar Thomson:

Whereas, Since the last meeting of the stockholders, John Edgar Thomson, the first Chief Engineer of the Pennsylvania Railroad, and for more than twenty years, and until his death, the president of the company, has departed this life.

Resolved, That the stockholders desire to record upon their minutes this resolution as expressive of their sense of the great ability, strict integrity and untiring industry with which John Edgar Thomson, their late president, devoted himself to the interests of the Pennsylvania Railroad Company from its first organization until the close of his highly distinguished and eminently useful career.

In this connection, the opposition to the abattoir project seems to be dying out, a committee of citizens having been taken by the president of the company to Jersey City to examine the arrangement of the Communipaw abattoir. A case of some interest to both patentees and those using such inventions has just been decided in the U S. Circuit Court, in that of the Locomotive Engine Safety Track Company *vs.* the Pennsylvania Railroad Company, before Justice Strong, of the Supreme Court. The point of the defense was that the patent was invalid because the invention was in public use or on sale, with the allowance of the inventor, for more than two years before his application for a patent. Judge Strong decided as follows: 1st. That the combination claimed was a patentable invention. 2d. That the patent granted was not void for want of novelty, and had not been anticipated. 3d. That there was no evidence that the patentee abandoned the invention, and, 4th. That the patent is not invalid, because the invention was in public use, or on sale with the allowance of the inventor, more than two years before the application for the patent. An infringement was proved, and injunction granted, with decree on account. This is a curious precedent, and worthy of notice, for there are hundreds of such inventions in use, and under this ruling it would seem that an invention may introduce a novelty, get it tried in the trade without royalty or patent license, and subsequently get a patent with recovery from every one previously using it. The "People's Freight Railway" does not seem to be dead yet. A meeting was held at Pottstown, Pa., last week, when the details of the line, a narrow gauge from New York to the Mississippi, were explained by Mr. McConaughey, who claimed to be in charge of the section represented, and stated that the whole route was districted to obtain local subscriptions. It is to be an iron turnpike road, open to all who wish to run their own cars and locomotives, and to be exclusively devoted to freight. If every man runs his train on an individual time table what a valuable road it will be to the locomotive and car works.

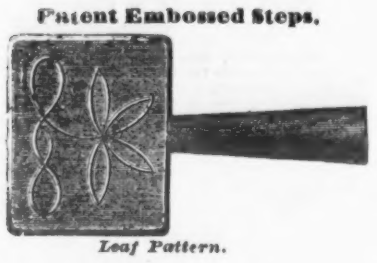
Change of Gauge on the Grand Trunk Road.

The increase in the carrying capacity of the Grand Trunk Railroad appears to give satisfaction to the people of Canada, and the newspapers refer to the change of gauge in commendatory terms. The Montreal *Gazette* gives an interesting history of the operation. The initiatory step was taken in 1872, when the gauge of the line between Fort Erie and Sarnia, a distance of 195 miles, was changed, but delays and the great expense attending the work caused a series of discussions of the best manner in which to finish the undertaking, and it was October of last year before the important section of the line between Stratford and Montreal was narrowed. This comprised 421 miles. The monetary crisis created embarrassment, and it was not until June that the decision was arrived at to proceed with the work on the eastern section. The delay greatly increased the labor of accomplishing the work, concentrating within some three or four months, the whole work of preparing for the change. The company had to order some fifty or sixty new engines, and to change the gauge of 1500 cars and carriages. The completion of the work—the entire cost of which is stated to be about £2,500,000—greatly increases the carrying capacity of the company, and adds largely to the convenience of travelers. The *Gazette* says editorially: "With the change thus effected, cars may be loaded at Portland with goods from Europe, and proceed to almost any point in the West or Northwest without interruption. Traffic loaded at the port of Montreal can be sent to Chicago, or even to San Francisco, without breaking bulk. And we have, by this change, a practically new route opened between this city and Boston, which can be traveled over in substantially as short a time as it takes to accomplish the journey by the present route through Vermont, for there can be little doubt that passengers will be able to take the cars in Montreal in the evening by the Grand Trunk Railway and find themselves in Boston on the following morning, by way of Portland, in time for breakfast."

The preparations made for carrying out the programme laid down for the eastern section were necessarily of a very complete character. Circulars were sent to the station agents west of Montreal, Sept. 11, stating that for the next ten days the "through traffic" for points east of Montreal on the Grand Trunk line should not be unnecessarily pressed, but as much as possible should be done in obtaining traffic to points reached by the Central Vermont, by way of St. John's, the object being to utilize the narrow gauge stock as fully as it could be made use of, and not to crowd traffic down to Montreal which could not be moved eastward expeditiously on the Broad Gauge line. The whole line between Montreal and Portland was divided into twenty districts, averaging about fifteen miles in length each, under the charge of an experienced overseer and three section foremen. From Richmond to Quebec was similarly divided into seven districts, and that from Quebec to Riviere du Loup into eight districts. On Thursday night some 600 or 800 workmen were lodged and fed in the freight sheds at Point St. Charles, which has been temporarily fitted up for that purpose, and on Friday morning early they were sent over the line, and distributed at points where their work was required. Altogether there were some 200 men engaged on the work. The last through broad gauge train to Portland left Montreal at 9 o'clock on Friday morning, and the last broad gauge train left Portland the same day at 1·20 o'clock, coming, however, no further than Island Pond. These trains were expected to meet at Groveton, and, after passing each other, they were required to display a signal agreed upon, showing that they were respectively the last trains. The moment the trains bearing this signal passed, the trackmen commenced their work of narrowing between Island Pond and Portland, the first part of the road that was narrowed. The last broad gauge trains between Montreal and Island Pond left the former place at 4 in the afternoon on Friday, and the latter at 2·15 These trains were to cross at Richmond, and then to display the "last train" signal, upon sight of which the trackmen proceeded with their work. In the same way the work of narrowing was proceeded with on the other sections; and with such promptitude was the work performed that at 8 o'clock on Saturday morning the work of changing the gauge was practically accomplished, at 10 o'clock narrow gauge trains were started eastward, and during the day some twenty five trains in all were sent off. During Saturday and Sunday the men withdrawn from other parts of the work to assist in this important change were on their way back to their several locations, and the whole work, which for some weeks past has been a source of anxiety and labor to the officers of the company, may be said to have been successfully completed by Monday.

H. D. SMITH & CO., PLANTSVILLE, CONN.

Patent Embossed Steps.



Leaf Pattern.

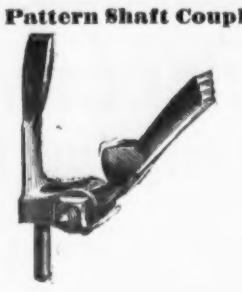
Star Pattern.

Established 1850.

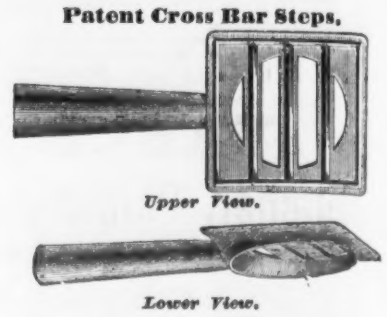
King Bolt Yokes.

No. 6 Fifth Wheels.

1871 Pattern Shaft Couplings.



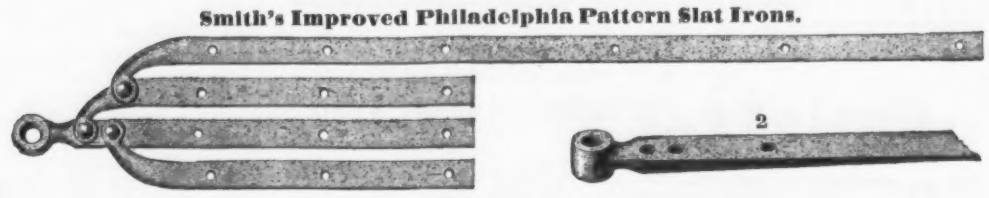
Patent Cross Bar Steps.



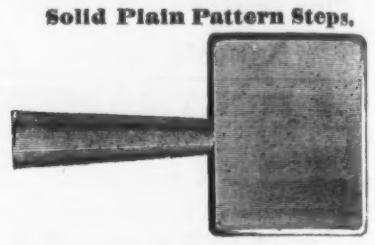
Upper View.

Lower View.

Smith's Improved Philadelphia Pattern Slat Irons.



Solid Plain Pattern Steps.



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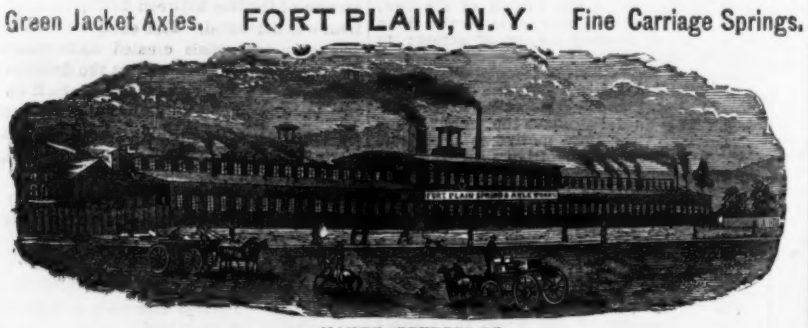

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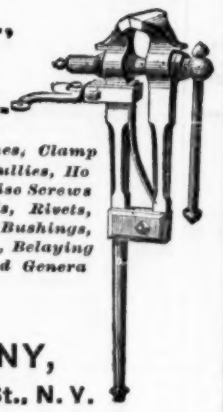

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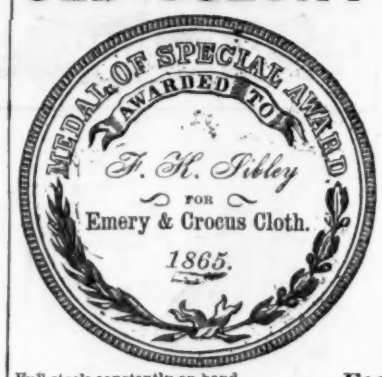

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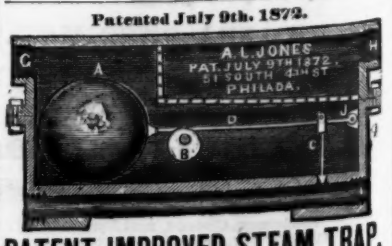

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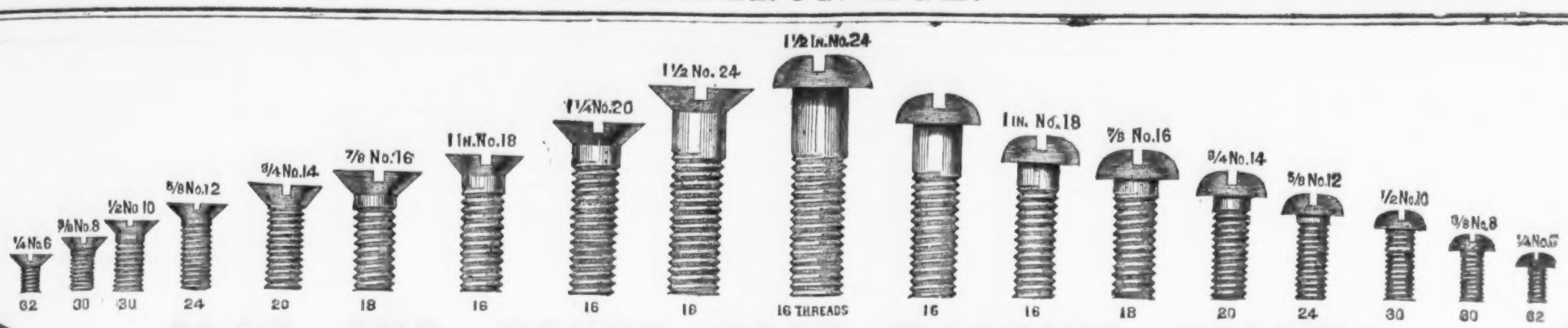

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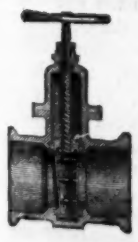

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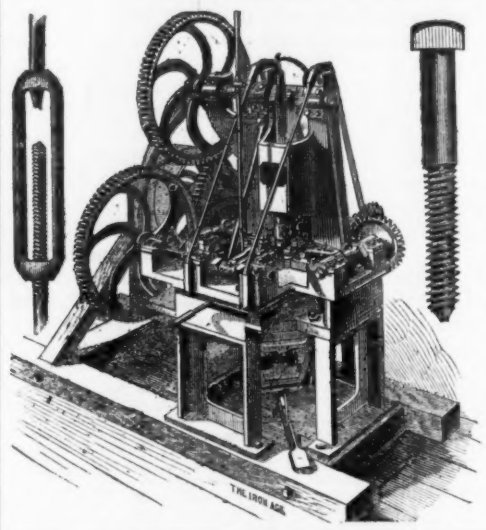

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The Metallurgy of Titaniferous Iron Ores.

The great extent of the deposits of titaniferous ores on the borders of Lake Champlain, in Northern New York, as noticed in a recent article, as well as the low price at which these ores can be furnished to the iron works of the Atlantic seaboard, renders the practicability of their use in the blast furnace and puddling furnace a topic of prime interest to the iron trade in its present condition.

Our statements in regard to the abundance of these ores upon Lake Champlain have been borne out by all who have examined the region. The location undoubtedly permits of cheap and extensive mining, with low priced water transportation to the principal points of consumption. The present condition of the iron trade, as well as the outlook for the future, renders certain the fact that whatever may be the demand hereafter, the day of high priced ores, with a resulting costly pig metal, has gone by. The American iron master, to command success in the future, will, perforce, be compelled to exercise every possible economy in both the selection of raw material and the conduct of its reduction. Labor has been reduced to a price at ore mines and blast furnaces below which it is neither desirable nor profitable that it should go. Railroad freights cannot be reasonably expected to rule lower than now. Coal rates, from the fact that the mines are exclusively in the hands of powerful combinations of capitalists, will not, in any case, be much reduced. Clearly, therefore, the only remaining opportunities for economizing in the production of iron are in the cost of the ore and the management of the furnace. Of these the chiefest is, of course, in the price of ores.

In addition to the deposits of titanic ores of Northern New York, other sections of the country are abundantly supplied with them—notably, the region of Central North Carolina and a considerable portion of Eastern Virginia. Hitherto disregarded, and, indeed, generally avoided as difficult of working and likely to be injurious to the product on account of the presence of titanic acid, these ores, if they can be shown to be useful, and, so far from being injurious, absolutely beneficial in admixture with other ores, will undoubtedly add a very considerable element to the repertory of the iron master. That such is the case there is the very best metallurgical authority for stating. In considering the uses for which these ores may be adapted, we will first approach their utility as material for the production of Bessemer pig, that grade of metal now being, from the quantity converted into steel and the growing demand, the most important.

While titanic ores are not in all cases found absolutely free from sulphur and phosphorus, they are so generally, especially in the United States, as to permit our classing them as practically free from these impurities. So far, then, they may be considered as offering fit materials for Bessemer pig metal.

The reduction of titanic ores, intelligently conducted in the modern blast furnace, results, as the rule, in the elimination of the titanic acid from the revived iron, and its presence to an almost exclusive degree in the slag. Whether an alloy can exist of titanium and iron, under the conditions of the blast furnace, is at this time a disputed point in metallurgy. Sufficient for our purposes at present is the statements abundantly proven that the resulting metal revived from these ores is unusually and peculiarly increased in tensile strength and ductility. Titanic ores being, then, as the rule, free from the elements most injurious to the production of steel by the pneumatic process, it remains to discover whether the metal reduced from them is to be considered injurious or beneficial for that process.

In deciding this point the only means at our service are the analyses of well known and successfully used Bessemer pigs of foreign manufacture, no metal from the ores under consideration having, so far as we know, been smelted for this use in the United States. The following table of analyses represents favorite English Bessemer pigs, smelted, in three cases, from red hematite ores of the Cumberland district solely, and in the fourth from an admixture of English hematite and Norwegian titaniferous ore:

	1.	2.	3.	4.
Metallic Iron	93·552	93·100	92·850	93·47
Graphitic Carbon	3·082	2·952	2·997	3·31
Combined Carbon	1·265	1·235	1·134	
Silicium	1·389	2·286	2·706	1·86
Sulphur	0·068	0·075	0·068	0·071
Phosphorus	0·027	0·055	0·028	0·076
Manganese	0·216	0·288	0·140	0.50
Titanium	0·006	0·006	0·007	1·15
	99·605	99·997	99·930	100 437

No. 1. Cleator (Cumberland district red hematite).

No. 2. Harrington (Cumberland district red hematite).

No. 3. Workington (Cumberland district red hematite).

No. 4. English hematite mixed with titaniferous ore from Norway.

Of these samples the favorite with the trade abroad was No. 4, smelted from Norwegian titantic ore. All of the samples contain titanium, the first three in inappreciable quantities, but the fourth to such a marked extent as to show that the per cent. of the titanic acid in the ore must have been very large; since, as has been stated, it is well known that the greater portion of that substance goes into the slags.

An analysis of the Norwegian ore used in the above No. 4, is reliably stated as follows:

Peroxide of Iron	22·63
Protoxide of Iron	28·96
Protoxide of Manganese	40·95
Titanic Acid	40·95
Alumina	2·11
Magnesia	4·72
Silica	·42
	100·35

Showing 39·80 per cent. of titanic acid to have been eliminated.

In discussing the ores of Central North Carolina, titaniferous magnetites, Prof. A. A. Fesquet, in a treatise on American pig metal for Bessemer steel (Jan., 1872), says, with reason: "Red hematites are not, as "some people state, the best or only ores for "the manufacture of Bessemer pig. It "should be remembered that the Bessemer "process was first rendered a success in "England through the use of Swedish "pig, made from magnetic ores, and "that at the present time Sweden is "still ahead in regard to the qual-"ity of its Bessemer steel. * * The ores "which we have examined, as coming from "North Carolina, are of the primary kind, "that is principally magnetites and com-"pact red hematites. In places, as in Swe-"den, they become mixed, the hematites "running into magnetites, and conversely." The titaniferous ores of Virginia are generally also primary ores, and principally magnetites. The titaniferous ores of Lake Champlain are exclusively magnetites. From the forging analysis and the statements given, we may safely assert that titanic ores are not only suitable for the production of Bessemer steel, but also that the presence of titanium in the iron, to an appreciable extent—as in sample No. 4. 1·15 per cent.—is rather beneficial than otherwise to the steel, resulting from the conversion of such pig metal. If this be so, we have undoubtedly, in these deposits, an enormous and economical addition to the supply of Bessemer ores in the United States.

The next point to be considered in treating of titaniferous ores is that of their use for ordinary pig metal in admixture with other ores in the blast furnace. On this point we have comparatively recent and very high authority for stating that such ores can be advantageously used. At the meeting of the British Iron and Steel Institute, in May last, Mr. Geo. W. Maynard, M. A., of New York, read before that body a paper on the iron ores of Lake Champlain, in which he described, among others, the titaniferous ores, and stated that in many analyses of these ores made by him he had never found phosphorus in other than the most minute traces. The analyses quoted then by him of these titanic ores were as follows:

	Split Rock.	Kingdom.	Iron Mountain.
Sesquioxide of Iron	38·43	23·77	20·36
Protoxide of Irod	23·40	21·24	25·46
Protoxide of Manganese	0·23	0·87	0·47
Alumina	0 34	11·86	9·35
Lime	3·54	3·54	7·75
Magnesia	2·13	4·09	0·13
Silica	16·46	21·64	10·26
Titanic Acid	14·70	13·15	16·37
	99·23	100·16	100·15
Metallic Iron	47·77	32·59	40·42

In the discussion which followed the reading of this paper, Mr. Forbes, the foreign secretary of the Institute, and without doubt the most thoroughly informed metallurgical chemist of the present day, as well as the very highest authority on titanic ores, from his experience in treating them, stated that "it was not always the "case that titanic ores were free from "phosphorus; in fact, he knew many ores "in which he could see the phosphate of "lime. Still, as a rule, titanic ores were "extremely free both from phosphorus and "sulphur, and the pig iron produced from "them was of a very fine quality; in fact, "in Sweden it was a common thing when "the iron stone contained sulphur to add "a small proportion of titanic ores (10 per "cent. to the charge), under the belief that "by some means or other the titanium "contained in them purified the other ores "from sulphur. There was no doubt the "result had proved satisfactory, but it was "very difficult to explain the reason why. "As stated in his last foreign report, me-"tallurgists in Sweden had imagined that "the titanium formed a compound with "the sulphur, possibly a sulpho-cyanide, "but there was no distinct proof what it "was; the only thing they knew with cer-"tainty was that titanic ores, both in the "United States, Canada, New Zealand, and "in Sweden and Norway, were such that "the metal produced from them was won-"derfully good. He (Mr. Forbes) had also "noticed in cases where these ores had "been smelted with very inferior coke, "containing a great deal of sulphur, that "the pig iron itself had been almost free "from that element." Here is the very best authority for recommending the use of titanic ores, which thus will insure the utilization of a very abundant furnace material in the United States, the sulphurous ores, with the advantage of producing a strictly neutral pig iron by the elimination of the sulphur. On the same point, Prof. Fesquet bears similar testimony of the North Carolina ores. He says: "The "titaniferous magnetites are especially "worthy of consideration; they are said "to exist in great abundance, and are free "from sulphur and phosphorus. They "produce the most excellent quality of "tool steel, and average 55 per cent. of "metal, from 10 to 12 per cent. of titanic "acid, and from 1 to 2 per cent. of man-"ganese and chromium. They will, mixed "in proper proportions with other ores, "and with suitable fluxes, greatly increase "the quality and toughness of the metal." As stated in a previous article, the iron resulting from smelting Norwegian ores at the Norton Iron Works, England, was of excessive strength, the tensile strength of the wrought iron being 52½ tons to the square inch, and in great favor for armor plates and similar purposes, while the pig iron commanded a much higher price than ordinary pig iron. Moreover, it is known that titanic ores, with a percentage of 14 per cent. TiO, are successfully worked now at Baltimore, Md., with 27 per cent. TiO at Bay St. Paul, Canada, and with 40 per cent. TiO at the Norton Works, England. If, then, the ore is useful in admixture to prevent "red shortness," and also for tool steel irons and others requiring great strength, an additional value is given to it over and above that which it possesses for Bessemer uses.

The third point of consideration, and one of extreme importance to the rolling mill interest of the United States, is the practicability of the use of these ores as fettling in the puddling furnace. The cost of fettling ores to the rolling mills of the country is a very serious item in the production of rolled iron. On the seaboard, and almost everywhere east of the Alleghany Mountains, the practice of fettling with large lumps of magnetic ore, principally from Lake Champlain, and almost universally phosphoric, though not titanic, is general. West of these mountains the fettling is applied in a paste made of ground ore and water mixed to the consistence of mortar. The cost of these ores in either section of the country will not vary far from $11 per ton, in the mill. If titaniferous ores can be successfully used for this purpose, they can be supplied at almost all points, where the other magnetites are now used, for at least half the present cost of the latter, reducing the cost of the rolled iron, so far as the element of fettling is concerned, to that extent; a consideration of great importance in the present state of the trade. Titanic ores have been tested as fettling with the best results. In 1871 the titaniferous magnetites of North Carolina were tried as fettling at the Kensington Iron Works, Philadelphia, with the report that they "stood up" equal to the best Lake Champlain magnetites not titantic. The titanic ores of Lake Champlain have been used as fettling in the puddling furnace with a reported result of six heats without repairs to the lining or any addition. If these reports be true, and they can be easily verified on trial, there is every reason to regard the use of such ores with favor for the purpose named. If, further, as Mr. Forbes states, the addition of a proportion of titanic ore to the charge of sulphurous ore is of advantage in the elimination of sulphur in the blast furnace, there is good ground for the belief that it will prove still more advantageous when used entirely as fettling in the puddling of a "red short" pig, and the production of neutral iron. Time and thorough trial will alone decide this point, but there are strong reasons for expecting a decided improvement in quality of the puddled iron with such fettling.

Granting the practicability of using titanic ores for Bessemer pig, for ordinary pig, and as fettling, the only point remaining to be discussed is the practicability of the easy reduction of such ores in the blast furnace. Here arises all the obstacles which have hitherto prevented the general use of these ores. Furnace managers who have used them by the "rule of thumb," as unfortunately too many ores are used, have condemned them as likely to chill or "bung up" the furnace. This simply arises from improper treatment of such ores in the furnace. A great deal of empiricism has been used relative to such ores. At most works their manipulation is carefully guarded as a trade secret, evidently from the high commercial value of the iron. Without pretending to give a positive flux for the reduction of these ores, the following authorities are quoted. Osborn, in his Metallurgy of Iron, p. 475, states that John Player worked the Norwegian ores, bearing 40 per cent. titanic acid, *alone*, at the Norton Iron Works, England, with the following charge, viz.: 2½ tons ore, 2 tons coal, 15 cwt. limestone and *ten cwt. basalt rock*. The blast temperature used was of 1000°.

Fesquet says "the fluxes to be preferred "for such ores are the multiple silicates with "metallic bases.," and that these are abundantly found in the immediate vicinity of the ores in North Carolina. Basalt rock is also largely present in connection with these ores on Lake Champlain. At the recent trial of the Henderson process at Trenton, New Jersey, as lately reported in *The Iron Age*, titaniferous ores in admixture with fluor spar, in proportion of 40 parts of fluor spar to 100 of ore, were used for the elimination of phosphorus from cinder pig in the puddling furnace, and the mixture was melted in 30 minutes. In practice this much is certain—the titanic ores of New York have been successfully worked, and with the best results, with the following admixtures: At Rochester, N. Y., with one-fourth each Lake Superior, Keene, Ontario and titanic; at Pittsburgh with one-third each Jackson (Lake Superior), titanic and mill cinder; on the Lehigh with Pennsylvania hematites, and at Pottsville with an argillaceous ore. At Baltimore titanic ores of 14 per cent. TiO are worked, it is said, in admixture of 50 per cent. with native ore. In all the above trials no difficulty was experienced with the working of the ores. With such facts before us, and with furnaces in England and Canada successfully treating ores with a higher per cent. of titanium than most in the United States contain, there can be no great difficulty in discovering the proper method. Once this is done, it is clearly to the interest of the iron trade of the United States to lay aside all previous prejudice against this class of ores, so abundant and so conveniently located for transportation. From North Carolina the titanic magnetites should be obtained for $6 to $7 per ton, delivered; from Virginia they should come within $5, and from Lake Champlain they can be supplied as cheap or cheaper than either. Yielding from 45 to 55 per cent. metallic iron in the furnace, such reduced costs for such ores mean to the furnace men and mill men of the United States the exact method of stopping the leak where the possible profit in iron making, since the panic of 1873, has slipped out. Low priced and abundant ores of a fair average yield will now alone, with a conservative production, restore general prosperity to both furnaces and mills.

Our Foreign Trade.

The report of the Bureau of Statistics for June, and the fiscal year ended June 30th, is a document of much statistical interest. We have not space to discuss its showing in detail, but some of the comparative totals will be examined with interest by a large proportion of our readers. The following table shows the gold value of imports, exports and re-exports for a series of fiscal years:

COMMODITIES.

Year.	Imports.	Exports.	Re-exports.
1868–69	$417,506,879	$175,192,658	$10,961,000
1869–70	435,988,064	377,637,090	16,125,260
1870–71	520,223,684	428,610,914	14,420,870
1871–72	626,595,077	427,487,131	15,690,455
1872–73	642,136,210	505,033,449	17,446,482
1873–74	567,406,342	569,552,470	16,349,619

SPECIE.

Year.	Imports.	Exports.	Re-exports.
1868–69	$19,807,876	$42,915 966	$14,222,414
1869–70	26,368,079	43,881,861	14,271,864
1870–71	21,270,024	84,403,359	14,038,629
1871–72	13,743,689	72,798,240	7,079,294
1872–73	21,480,937	73,905,546	10,703,028
1873–74	28,454,906	59,699,686	6,930,719

TOTAL IMPORTS.

Year.	Imports.	Exports.	Re-exports.
1868–69	$437,314,255	$318,038,624	$25,173,414
1869–70	462,356,183	420,518,951	30,427,124
1870–71	541,493,708	513,044,273	28,459,899
1871–72	640,338,766	501,285,371	22,769,749
1872–73	663,617,147	578,938,985	28,149,511
1873–74	595,861,248	629,252,156	23,780,338

An examination of the totals of imports will show the effect of the panic in diminishing the demand for foreign goods. The following table shows the value of the importations during the last three fiscal years of the five leading classes of manufactured goods brought into the country in competition with American manufactures:

	1871–72	1872–73	1873–74
Iron and steel	$55,510,188	$59,308,388	$33,713,455
Cotton goods	35,307,447	35,201,317	28,183,878
Woolen goods	52 408,471	51,075,462	46,882,901
Silk goods	36,448,618	29,989,869	23,997,301
Linen goods	21,220,496	20,428,315	17,473,765
Total	$200,925,220	$196,003,351	$150,251,300

The statistics of exports of domestic products show a very gratifying increase, which it can scarcely be expected will be maintained during the current year. During the fiscal year 1873-74 we increased our exports to the amount of $54,500,000, currency, and decreased our specie export by $14,200,000, a gain of $62,600,000, gold, to our credit in our account with foreign nations. From present indications it is probable that the totals of both imports and exports for the current fiscal year will show no important changes as compared with 1873-74. It is not likely our importations will fall off materially, or that we shall materially increase our exports; but another year of average industrial and commercial activity and of commercial prosperity will probably do much to increase the balance in our favor.

The Granite Mills Disaster—The Verdict.

The verdict of the coroner's jury empanelled to inquire into the cause of the deaths of the victims of the Granite Mills fire, printed in another column, is a very unsatisfactory document, though good enough so far as it goes. Our only objection to it is that it leaves out of consideration the moral responsibility of those who owned the mill in which so many lives were lost for want of adequate means of escape. We perfectly agree with the jury in attributing the fatality of the fire to a defective architecture, which provided

no means of exit from the upper stories save through a tower, but why are not those who thus built their mill legally responsible for criminal carelessness, at least? Not only was the tower stairway the only means of escape, but that stairway was soon rendered impassable by the dense smoke and great heat, thus cutting off all access to or exit from the upper floors save by the windows. Had the tower been fire-proof it would not have been so bad; as it was, the wooden lining and pine stairs only furnished fuel to the flames, which roared up through the tall shaft as through the chimney of a furnace.

As regards the so-called fire escapes, the jury have but little to say, although those employed in the Granite mills were so radically defective that a jury of twelve intelligent men could have but little difficulty in forming a very decided opinion concerning them. A skillful gymnast, a sailor, or even a cool headed man, with plenty of time at his command, might have reached the ground safely by means of them, but it is evident they were utterly useless to the women and children, for whose safety, in case of fire, they were supposed to make adequate provision. Indeed, it is doubtful if they were not wholly inaccessible owing to the absence of ladders to the skylights in the roof; but if such were at hand, it is evident that the difficulties and dangers of the descent were so great that, even in the face of death, no one ventured the hazardous attempt, since no one is reported to have been saved by this means. Why such provision should be regarded as better than no provision at all, we cannot understand. The suggestions of the jury are in the main sensible, especially that which relates to the employment of means whereby an alarm of fire may be sounded in every room of a factory at the same instant. To this we may add that in the event of such an alarm being sounded every man should know just what to do, and, by previous drilling, have learned the duties which he is best fitted to perform. We hope this fearful calamity will not be without good results in calling the attention of mill owners to the imperitive necessity for many reforms now only too generally neglected.

Scientific and Technical Notes.

We take the following items from an interesting paper upon recent scientific progress, by Prof. Barnard, of Columbia College:

DENSITY OF HYDROGEN IN COMBINATION.

The avidity with which certain metals, as palladium, sodium and iron, absorb hydrogen is well known. The hydrogen thus absorbed forms a proper alloy with the metal absorbing it. Since, according to Graham, the elementary metals in alloys preserve the densities belonging to them when uncombined, it follows that, by comparing the ascertained density of any given metal with that of the same metal alloyed with hydrogen, it is possible to deduce the density of hydrogen itself in the solid state—a state to which it is impossible to reduce it by pressure or by reduction of temperature, or by both combined. This method has been applied by Messrs. L. Troost and P. Hautefeuille in the case of alloys of hydrogen with palladium and sodium; and the results are briefly stated in a recent number of *Les Mondes*. These experimenters found the density of palladium saturated with hydrogen to be 11·06, while that of the palladium itself, previously to the experiment was 12·0. From these data, combined with the increase of weight consequent upon the absorption of the gas, they deduced a density for hydrogen in the solid state of 0·62. A similar experiment made with sodium having an original density of 0·970, and a density, when alloyed with hydrogen, of 0·959, gave, for the hydrogen in combination, a computed density of 0·630. The two determinations very nearly agree, and the mean of them, viz., 0·625, may be taken as the probable density, which would give to hydrogen in the solid form a specific gravity somewhat above that of lithium, which is 0·50.

EFFECT OF HYDROGEN IN IMPAIRING THE TENACITY OF IRON.

Iron or steel wire which has been acted on superficially by sulphuric acid is usually found to be altered in its properties. Its weight is increased, its tenacity is injured, so that, though originally soft and flexible, it easily breaks; and when a freshly-broken end is moistened by the tongue it effervesces as if acted on by a mineral acid. These effects after a time disappear. Prof. Osborne Reynolds, of Manchester, has ascertained that they are owing to the absorption of hydrogen generated during the chemical reaction which takes place when the wire is immersed in the acid. He found that, if an iron tube, closed at one end, be immersed in a dilute solution of sulphuric acid, hydrogen passes through the walls of the tube into the interior, and may be collected by attaching an India-rubber tube to the open end of the iron one, and passing it under a gas holder. Prof. Reynolds concludes that, whenever iron undergoes oxidation under water, it becomes satuated with hydrogen, and thus loses tenacity—an important consideration in the case of iron steam boilers or iron ships.

EFFECT OF HEAT ON GERMINATION.

It has hitherto been believed that a temperature of 150° Fahrenheit or upward is sufficient to destroy the germinative principle in wheat. Some experiments by Krasan, described in the *Chemical Central-Blatt*, of Leipzig, show that this is a mistake. In these experiments it was found that wheat thoroughly dried by very slow heat, with the help of calcium chloride retained its capacity for germination unimpaired after being subjected to the temperature of boiling water for several hours. It need hardly be said, however, that this cannot be true of wheat which has not been dried. Boiling water promptly destroys the principle of life in all organisms which it can penetrate.

IMPORTANCE OF THE INORGANIC CONSTITUENTS OF FOOD.

The bodies of animals in a state of health, though chiefly composed of organic substances, contain, nevertheless, always certain inorganic salts, either in combination or in solution. The soft parts of the bodies are here intended, and not the bones, which are, of course, largely composed of inorganic matter. Mr. J. Forster has recently described in the *Zeitschrift fur Biologie* some interesting experiments on the effect of gradually reducing the quantity of these salts in the system, by feeding animals with food of an entirely nutritious description, but completely deprived of such salts. The food employed consisted of albumen, starch and fat, with entirely pure water. Animals thus treated suffer gradual derangements of the functions of various important organs, which derangements go on until the power of assimilation of the food taken is so far reduced as to prevent the proper repair of the ordinary waste of the system. The natural consequence of this would be to produce decline or death. But death usually ensues before it could be brought about by a cause so slowly acting, since the deficiency of salts, by arresting some of the processes necessary to life, precipitates the destruction of the organism before it could perish by exhaustion. Exhaustion is the effect produced upon the muscles by withholding salts, but in the nerves there appear, first, increased excitability, and then paralysis of the nerve centers. The quantity of salts necessary in the food is less than has heretofore been supposed, but further experiments are necessary to determine its exact amount.

INK THAT WILL NOT THICKEN NOR MOLD.

The *Moniteur des Products Chimiques* gives a receipe from Messrs. Suyerbuyk & Koning for making an ink which shall have the good qualities above mentioned. The essential components are those of common ink, viz., infusion of nut galls and ferrous sulphate (photo-sulphate of iron), but the nut galls are to be infused in alcohol (say half a pound of the first in powder to a pint of the second at 82° Baume), and digested for twenty-four hours at a low temperature; and the infusion is then to be slowly mingled with a solution of about three ounces of the sulphate and an equal quantity of gum arabic in a pint of water. After the mixture has stood a week, add a few drops of vanadic acid. This ink will always flow freely, and will form no sediment.

EFFECT OF COAL GAS ON PLANTS.

It has long been believed that the effect of the escape of coal gas from leaking mains is injurious to shade trees in cities. The *Chemical Central Blatt* gives the results of a series of experiments by Mr. J. Bochm, designed to test the action of this gas on growing plants. Of ten plants in pots (varieties of fuchsia and salvia), among the roots of which coal gas was conducted through openings in the bottoms of the pots, seven died in four months. To show that the plants were not killed by the direct action of the gas, but by the poisoning of the soil, seeds were sown in earth through which for a long period of time gas had passed for an hour or two daily. The rootlets put forth by these seeds remained very short, and soon rotted. A healthy plant having been transplanted into such soil, perished in ten days. The author thinks that the frequency with which the shade trees in cities decline and die without obvious cause may be explained by these facts; but the remedy which he proposes, which is to inclose all street gas pipes within larger tubes having openings to the air, through which ventilation may be maintained, is one involving too large a necessary expenditure to recommend itself to gas companies.

COPPER CONDUCTORS OBJECTIONABLE FOR DRINKING WATER.

It appears from experiments detailed by Mr. E. Reichards, in the *Archiv der Pharmacie* for June, that water in contact with copper takes up a sufficient quantity of the metal to be injurious. The amount absorbed was found in certain cases to be as great as seven or eight parts of copper to one million of water. As in the case of lead, the degree of contamination increases with the duration of the contact, and whenever copper pipes are employed to convey water for drinking or for culinary purposes, the water which may have been standing in them should be completely discharged before drawing for use.

DEPOSIT OF SALT IN THE ISTHMUS OF SUEZ.

At a session of the French Academy of Sciences in June last, Mr. De Lesseps communicated to that body a description of a remarkable deposit of salt found in the excavations made for the Suez Canal, at the bottom of the Bitter Lakes. The deposit is twenty kilometres (12·4 miles) long, five kilometres (3·1 miles) wide, and about thirteen metres (43 feet) thick at maximum. It is formed by the interstratification of salt and sand, the salt strata varying from ten to thirty centimetres (4 inches to 1 foot) in thickness. Mr. De Lesseps refers the commencement of this formation to the period when there were two navigable canals across the Isthmus, of the former existence of which certain passages of ancient writers, as he thinks, furnish evidence. [If Mr. De Lesseps means that two canals across the isthmus ever existed at the same time, nothing is less probable. If he means that the same canal, after having been long abandoned and allowed to fill up, was subsequently reopened, the statement is in conformity with such historical evidences as exist, and such observed facts as have been heretofore reported]. At the early period here referred to the soil of the isthmus between the lakes and the Red Sea, which he thinks has since been raised by a general upheaval of the earth, was below the level of this sea; and there was an artificial barrier, with a lock, at Suez, designed to exclude the waters, of which he supposes the mean level to have been three metres (10 feet) higher than that of the isthmus at this point. When the third successor of the Caliph Omar attempted, by closing the canal, to deprive the Arabs, then in a state of insurrection, of the grain of Egypt, the water of the Bitter Lakes evaporated, and left the first or lower stratum of salt in its bed. Afterward some unusually high tide, such as Mr. De Lesseps states that he himself had seen twenty years ago, filled the basin anew; and by a second evaporation another stratum was formed. It is necessary only to suppose a succession of these processes to account for the entire deposit. This immense salt bed is exposed for a considerable distance in the bottom of the Suez Canal, and is slowly dissolving in the waters of the Mediterrancan and Red Seas now admitted to it. The recent filling of the extensive lake basin, here referred to, with water has singularly modified the climate of the surrounding desert. The largely increased surface evaporation is the occasion of frequent rains, though rains were previously almost unknown.

Apparently the hypothesis of Mr. De Lesseps of a geological upheaval in the region of the isthmus, within a period of not more than two or three thousand years earlier than the present, cannot be maintained. Other causes, such as the action of the waves, may long before have formed a bar cutting off the lake basin from the Red Sea, of which that basin may have been earlier a part, precisely as similar accumulations of sand have been formed along the whole southern coast of the United States, and along the south shore of Long Island; and supposing this to be true, the excessive tides imagined by Mr. De Lesseps may have done the rest. This hypothesis would also afford sufficient time for the formation of so thick a deposit, which could hardly be the case if the origin is to be referred to a period more recent than that of the Caliph Omar—that is to say, to a point of time less than thirteen hundred years distant in the past. Moreover, no geological upheaval in the region of the isthmus can have been so purely local as not to affect the valley of the Nile, which has very certainly not been so recently disturbed; while the critical examination made with the spirit level by Prof. Piazzi Smyth, of the bed surfaces of the huge sockets, ten or fifteen feet square, cut in the solid rock to receive the corner-stones of the great pyramid of Gizeh, preserved as they have been uninjured for centuries by the accumulated overlying sands, shows that they are still as truly horizontal as they could be made by the most accomplished engineering skill of the present day, and that, therefore, they have not been altered in position for more than 4000 years.

Mr. De Lesseps presented to the Academy an enormous block of the salt from this deposit to illustrate his description.

ELECTRO-TORSION, OR THE TWISTING OF AN IRON BAR BY THE ACTION OF ELECTRIC CURRENTS.

The London *Philosophical Magazine* for July contains a synopsis of a recent communication made to the Royal Society by George Gore, Esq., on a new and remarkable phenomenon in the action of electricity upon iron, which consists in the very perceptible twisting of a bar of this metal by the joint effect of currents passing through it longitudinally, and passing round it in the insulated wire of an enveloping helix. The twist may be made so great as to exceed even a quarter of a revolution, and its amount is rendered very conspicuous by means of an index twenty inches long, suitably attached to the end of the bar. The combined influence of both currents is necessary to produce the torsion. Either current singly produces only the ordinary effect of magnetizing the bar, either transversely or longitudinally, without altering its figure. The direction of torsion is definitely related to the directions of the currents producing it. Calling the twist of an ordinary screw a right-handed torsion, the following law may be stated: When the axial current flows from a south pole toward a north pole, the torsion is right-handed; when from a north pole toward a south pole, the torsion is left-handed. If both the currents be reversed, therefore, the torsion remains unaltered; but if either be reversed separately the direction of the torsion is reversed likewise.

When the currents are not simultaneous but successive, torsion is produced, but in a lesser degree. This appears to be owing to the fact that the first current leaves a residuary magnetism in the bar, which conspires with that produced by the succeeding current; the effect being similar to that which would be due to a very much feebler simultaneous current. The torsion produced by a coil current may thus be used as a test of the residuary effect of an axial current, and that produced by an axial current may similarly serve to detect, and perhaps to measure, ordinary magnetism in a bar. The torsional influence is uniformly distributed throughout the length of the bar subjected to experiment.

No torsional effects were observed with rods of platinum, silver, copper, tin, lead, or, in general, any metals or other substances not magnetizable; but nickel rods appeared to be susceptible to the influence, though by no means to the same degree as rods of iron.

ALLEGED EXPANSION OF METALS IN SOLIDIFYING.

An analogy to the expansion of water in freezing has been found in the solidification of bismuth from a state of fusion. The same property has been supposed to belong to certain other metals, as, for instance, cast iron, antimony, silver and gold. A paper recently presented to the Royal Society, by Mr. Robert Mallet, shows that in the case of cast iron this is not true. The specific gravity of a large volume of molten cast iron was experimentally determined by weighing in a large wrought iron vessel of conical shape, the mouth being six inches in diameter and the base eighteen, the vessel having been completely filled, and kept filled till the whole had attained its maximum temperature. This vessel was first weighed empty, then again when full of water, and subsequently once more, after having been filled with the molten metal and cooled. The resulting specific gravity thus ascertained was 6·650; while that of the solid cast iron, determined after the experiment in the usual way, was 7·170. The experiment was varied with similar results. Solid metals will, nevertheless, often float on the same metals in a fluid state. Mr. Mallet accounts for this by supposing the existence of a repellent force. This force depends for its amount on the bulk of the solid, the extent of surface of contact, and the difference of temperature between the solid and the molten metal. Lead, for example, floats on melted lead when in thin plates with large surface, but sinks when in more compact masses. The difference of specific gravities is here considerable, that of solid lead being 11·361, while that of the same metal in fusion is no more than 11·070.

NEW CALCULATING MACHINE.

In *Silliman's Journal* for October, just published, we have a description of a new machine for performing the ordinary operations of arithmetic, given by the inventor, Mr. George B. Grant. So far as facility and certainty of operation are concerned, the well known machine of Thomas De Colmar leaves nothing to be desired; but it is one, according to the account of it given, would seem to have the advantage over that in point of compactness. If such should be the case, and if, as it would seem, the mechanism is less complicated, the invention will probably be a useful one, as it may bring the means of mechanical calculation within the reach of a larger number than can at present afford to possess them. There is but one objection to the machine of Thomas, and that is its price. We are not informed whether the machine of Mr. Grant is in the market.

The Fall River Fire.—Verdict of the Coroner's Jury.

The verdict of the Coroner's Jury, on the Granite Mill disaster, was rendered on Saturday at 3 p. m. It is as follows:

We, the undersigned, having been summoned as jurors at an inquest before Andrew W. White, Esq., of Fall River, a Coroner in and for the county of Bristol, did assemble on the 21st day of September, 1874, to act on the dead bodies of the victims of the burning of the Granite Mill No. 1 in said Fall River, on the morning of the 19th of said September, and having proceeded to view the body of one James Turner, then lying at his home in said Fall River, did proceed to make examinations into the cause or causes that led to his death, which examination then begun was continued by adjournment from day to day until October 3, 1874. At the time we were summoned the number of dead and wounded was considerable, and for some days thereafter the death rate increased, but at the time of making this report the jury believe all those now living are likely to recover. The number of witnesses examined during the inquest was 49, and two recalled, and their testimony was voluminous and full. Aware of the magnitude of the disaster, not only appalling in its immediate vicinity, but sending a thrill of horror throughout the country, the jury have left no avenue of inquiry unsearched that might throw light on the inquest. The testimony so taken having been fully published in the local papers, and extensively by the press in general, we do not deem it necessary to recapitulate here the general outlines of the evidence. In the narrative now following the salient points will appear, many witnesses giving merely accumulated testimony.

It was in the evidence that the first alarm of fire on the morning of Sept. 19 was struck from Box No. 72, corner of Sixth and Pleasant streets, the fire being first discovered in the mule room on the fourth story at pair of mules No. 15, 6:50 a. m. From the time the alarm struck, all the fire department, with their apparatus, were as promptly on hand as could be expected from the confusion of alarms caused by the striking of four different boxes at about the same time, and we further say that it was in evidence that the hooks and ladders included in this department were insufficient in an emergency of this kind, and poorly handled on this occasion; and after deliberate examination we now say—and, as an act of justice, are glad to say—that the many reports concerning the other branches of the fire department are unfounded. And, upon further consideration, the sad truth becomes apparent that due precaution was not used in giving the alarm to persons at work in the sixth story. Had such alarm been given, and the care indicated taken, the lives of all the persons in that story might have been saved, notwithstanding there was but one escape therefrom, viz., the tower stairs; and we should be remiss in duty did we not say, in our judgment, that it is remarkable that the fire, being discovered in the mule room, in the fourth story, that among all the men employed there, as well as those in the fifth story, to whom there can be no doubt the alarm was general and ample, did not have presence of mind enough to warn their fellow operatives in the sixth story to flee from their fiery fate; and had even the male operatives in the sixth story not become panic stricken at the first alarm of fire that reached them, they might have led all the women and children in their charge down the tower stairs in safety.

There has been much criticism in regard to the means used by the corporation to extinguish and prevent fires in their mills, and we now pass to consider the means used in this connection, and then to the construction of this mill as regards its style of architecture in affording means of escape in cases like the present. The evidence fully shows that all the appliances for extinguishing fires in all the stories, such as tanks, pumps and pipes, and horizontal pipes and hose in the various rooms were in this mill apparently ready for use on the morning of the fire, but apparently water was wanting in them, and the hose and pipes were useless in the fourth story at this time. The construction of the mill, of which much has been said, was also in evidence, and we now say and believe it to have been the aim of the corporation to furnish every facility that money could furnish, and the lessons of the past furnish for the escape of help from their mill in case of fire. But this great disaster has shed a far-searching though lurid light on the subject of mill architecture. In this particular it was proved conclusively that there were not ample means of escape from the attic. Had there been, the loss of life would have been avoided, and we now suggest as an additional means of safety and escape that, in case of fire, it should be so arranged that an alarm struck in any story should reach all others in the mill, and here from the evidence we do say that it clearly and indubitably appears that all the means of escape by doors from every story were free and unobstructed, except by smoke and flame, there being no locks or bolts on any door communicating with any room excepting the lower door leading to the tower, and that is always open during the time the help is employed. And we now say that the approximate cause of the death of said James Turner and the twenty-two others whose presence there is in evidence, on the morning in question, was caused by the burning of the mill, they either being destroyed by the fire inside or killed by leaping to the ground from the mill. And in returning the inquisition hereto annexed, and in closing the preceding statement, with all the facts in distinct reality, we say let the lesson not pass unheeded, either to the mill owners or the public in general, that human life is precious, and in all means that tend to save, either particularly or generally, the precious boon to the poorest mortal has the sanction of all mankind, and an example in Him who died for all.

Commonwealth of Massachusetts, Bristol county, ss.—At an inquisition taken at the City of Fall River, in the County of Bristol, the 21st day of September, in the year of our Lord, 1874, before Andrew W. White, one of the coroners, upon the view of the body of James W. Turner, there lying dead, by the oaths of the jurors, whose names are hereunto subscribed, whom, being sworn to inquire in behalf of said Commonwealth when, how, and by what means the said James Turner came to his death, do, on their oaths, say they do find that the said James Turner came to his death on the morning of the 19th day of September, A. D. 1874, by jumping from the sixth story of Granite Mill No. 1, in Fall River, to the ground, said mill being then on fire, and also that twenty-two others came to their death from the same cause, together with the fire inside the mill consuming or suffocating them.

In witness whereof the said coroner and jurors to this inquisition have hereunto set their hands and seals this 3d day of October, A. D. 1874.

ANDREW W. WHITE, Coroner.
J. B. TRENCH, Foreman.
CHESTER W. GREEN.
CHARLES ALMY.
DANIEL HILLWELL.
EARL P. BOWEN.
WM. A. KENNEDY.

Charcoal Iron Manufacture in Vermont.

SOUTH SHAFTSBURY, VT., Oct. 2, 1874.

To the Editor of The Iron Age: DEAR SIR—As I have seen but very little in your paper relating to the iron interests of Vermont, I wish to call attention to a few facts, more particularly with reference to the manufacture of charcoal pig iron in this State. It may not be generally known that the town of Tinmouth, in this State, was among the first towns to attempt the manufacture of charcoal pig iron, although at S. H. Ransom's stove store in Albany, N. Y., may be seen a piece of pig iron with the date 1771 cast on it. This piece of iron was made at the old Lake furnace, near Salisbury, Ct. The writer recollects seeing a stove with the words "Tinmouth, Vermont," cast on the hearth plate, in the year 1830. This was before a cupola such as are now used for smelting pig iron for stoves was in use, or even known in this country. We have now in our employment in Troy, N. Y., a man who cast some of the first stove plates that were made in Albany, and at that time nothing but reverberatory furnaces were used. This was some fifty years ago. Charcoal pig iron was made at Brandon, Vt., as early as 1835, but the sound of the long tin horn that used to be blown to call the workmen to cast stoves, hollow-ware and cauldron kettles twice or three times in 24 hours, has long since sounded its last shrill notes that used to reverberate among the lofty peaks and down in the deep valleys of the Green Mountains.

For a number of years past there has been but three blast furnaces of any description in operation in the State of Vermont. One of these furnaces is at Pittsford, one at South Shaftsbury and one at Plymouth. None of these furnaces are at present in operation. The South Shaftsbury furnace has been out of blast since February last, and the Pittsford furnace went out of blast about two months ago. The South Shaftsbury furnace will go in blast about the 15th of this month, having a large quantity of charcoal and ore on hand. This furnace has made about 10,000 tons of car wheel iron in the last four years. I will give you, in some future article, an account of ores occurring in this State. S.

The Real Reasons why Castings in Iron are Accurate Copies of the Mold.

BY ROBERT MALLET.

The fact that cast iron does take very accurately the form of the mold in which it is cast has been for a length of time attributed to the supposed fact that the metal expands in volume while passing from the liquid to the solid state—a supposition which for more than a century has passed current, though without any sufficient proof. In a paper read before the Royal Society on the 11th of June last, I disproved by two independent experimental methods the supposed fact that cast iron does expand in consolidation from fusion. The paper itself will probably be published in full by the Royal Society in the latter part of this year. Meanwhile it may be stated that the methods pursued consisted in, first, the determination of the specific gravity of liquid cast iron, by weighing equal volumes of the liquid metal and of distilled water, the specific gravity of the same cast iron at 60 deg. Fah. being also determined; secondly, by determining the dimensions of a spherical shell of cast iron heated to bright redness, and then filled with liquid cast iron before being heated, when filled, and during the cooling back to the temperature of the atmosphere, when its dimensions were found the same as at the beginning; also by determining the specific gravities of the circumferential and central portions of the ball of cast iron when cold which had filled the shell. The central portions were found much less dense than the circumferential parts, as is well known to be the case in all castings in iron, of whatever size and form; but if the expansion in volume had taken place in the ball cooling by radiation, the central portions must have been found much more dense than the circumferential parts. The agreement of these two independent trains of experiment removes all doubt as to the completeness of the proof that cast iron does *not* expand in volume in passing from the state of liquid fusion to that of solidity by cooling; and it is therefore certain that the degree of exactness with which cast iron takes the form of the mold into which it is cast is to be otherwise accounted for. It is not necessary I should here advert to the objects in relation to certain lunar volcanic theories with which the above experiments were undertaken, nor to the conditions under which cast iron in the solid state may or may not float on cast iron in fusion; the latter facts, erroneously interpreted, having been, in fact, the foundation upon which the supposed notion of the expansion of cast iron during consolidation has been based. For these and the details of the experiments I must refer to the paper itself. In the mean time some useful deductions of a practical character may be drawn from the facts ascertained. Were it the fact that cast iron in solidifying did expand in volume, a little consideration will show, that such expansion would result, not in the casting being an accurate copy of the mold—whether of green or dry sand, or loam—but must be a distorted copy the expansion in volume of the metal filling the mold being, in effect, the same as if it were exposed to the hydrostatic pressure of a liquid pumped into it, the yielding to which would be greatest where the walls were least resistant, or where the force to which they are exposed is greatest—namely, where the surfaces exposed to pressure were the largest. Thus, for example, a flat plate molded from a pattern of equal thickness throughout would, when cast, be no longer of equal thickness throughout, but have one or both of its broad surfaces forced outward so as to make the plate thickest toward the central parts, whilst the edges and corners of the plate which consolidate first would remain nearly unaltered, and the metal be found not even completely forced into contact with those parts of the mold; in fact, no form of casting except that of a sphere could under the supposed conditions of expansion in volume remain an undistorted ectype of the pattern, nor could any rigidity in the mold prevent his, the expansive force being by hypothesis irresistible, like that of water freezing into ice.

Cast iron does, however, as is well known, take the form of the mold, as formed of sand or loam by the usual methods of the founders, with great fidelity. We must except, however, the case of chills or massive molds of cast iron, the liquid metal cast into which is so instantly chilled by contact as not to form a very accurate transcript of the mold. But though cast iron does take a very sharp and accurate transcript of the mold when cast, it does not do so to a greater extent than do several metals to which the supposed property of expanding on consolidation has never been attributed. Thus, zinc affords castings of exquisite sharpness from sand molds, as all those must have remarked who have seen the superb ornamental castings in that metal for architectural and other purposes which form the staple trade of the great German and Belgian zinc foundries. Lead, also, when carefully preserved while in fusion free from oxidation and cast in slightly greased molds so as to reduce any oxide formed therein, affords castings of exquisite sharpness, as may be observed in those of the ancient lead work of the roofs of churches and other buildings of from 200 to 300 years ago in France and Belgium. Gold, silver, copper, and most of their alloys, on the contrary, afford generally more defective castings and wanting in sharpness. The circumstances upon which these opposite results arise are extremely complicated, and to fully elucidate them would require more space than can here be afforded; they involve conditions mechanical, chemical, and molecular, affecting both the metal cast and the nature of the mold in which it is cast, as well as the relations of these to each other. Amongst these the following are, perhaps, the most important: First, the density of the metal itself. Whatever be the nature of the metal, it fills the mold when full under a certain hydrostatic pressure due to the hight of the liquid column and to the density of the metal, and whatever the metal may be, this is the mechanical force by which it is compelled to follow and fill while liquid the sinuosities of the mold. Let us suppose the liquid head constant, say 2½ feet or 30 in., we readily see how enormous a difference there yet is in the mold filling force due to density alone in the five metals, aluminium (which gives extremely defective castings), zinc, cast iron, lead and gold, their densities being:

	Specific gravity	Lbs. per sq. inch under 30 in. head
Aluminium	2·560	2·82
Cast iron	7·110	7·826
Zinc	7·146	7·896
Lead	11·360	12·552
Gold	19·340	21·371

Thus, in the last of these metals the hydrostatic pressure tending to fill the mold completely is about seven and a-half times greater than in the case of aluminium, and yet both these metals produce inferior castings, while the three intermediate metals afford sharp and good ones. Secondly, the specific capillarity when in fusion and viscosity while passing from the liquid to the solid state. Different metals are liquid in very different degrees while in perfect fusion, and therefore require very different degrees of pressure to force them into angular cavities. Upon this point physicists have as yet given us but little exact information. The greatest diameter of spherical drops capable of being assumed by any metal when taken in connection with its density is, however, a rough measure of the resistance which each presents to being forced into angular cavities of a mold of such material that it is not wetted by the liquid metal; thus fluid solder will readily penetrate between the edges of two clean tin plates, but will not enter at all if the plates be tarnished or blackened by a candle flame. Drops of mercury cohere at larger diameters than those of liquid lead. So also different metals differ in the range of viscosity through which they pass between their state of most perfect liquidity and that of solidity. Lead and some of its alloys, such as plumbers' solder, pass through a very long range of viscosity; brass and copper do so likewise, though in less degree; cast iron, and in general all the metals that crystallize most readily and best, pass through a very brief stage of viscosity. Where the melting point of the metal is a low one, one of the effects of this prolonged viscous stage, during which the metal contracts by loss of heat, is that its withdrawal from the sides of the mold is not compensated by a sufficient continuance of hydrostatic pressure, owing to imperfect liquidity. Cast iron is remarkably free from this objection; its melting point being very high and its range of viscosity small and confined to a small range of temperature, the metal is maintained, though constantly contracting by loss of temperature, in close contact with the mold by hydrostatic pressure up to within a brief period of its setting. Thirdly, upon the tendency of the metal to oxidate or combine with other elements presented to it in casting, and producing compounds less fusible than the metal itself, greatly depends the perfection or imperfection of the castings produced from it. Fluid zinc oxidates but very slowly up to a temperture somewhat above its melting point, but it oxidates rapidly at and above a bright red heat; hence zinc gives perfect castings; but when it is alloyed with copper the melting point of the brass is raised ot such a point that the zinc oxidates very rapidly, and produces that "tailing" and general scurfiness of surface which is the plague of the brass founder, and the oxide of zinc is not reducible back to metal at the temperature at which brass is cast by any chemical agent capable of being introduced into the substance of the mold. In cast iron, on the other hand, its tendency to oxidate by contact with the atmosphere when in fusion is opposed by the presence of silicon and carbon in the metal itself, and any oxide superficially formed is reduced back to metal with great facility by the hydrogen and carbonic oxide evolved from the moisture and charcoal, or coal-dust, or other carbonaceous matter entering into the constituents of the mold. Gold is inoxidizable, but possesses a vigorous affinity for sulphur, and it is probable that the film which may be observed upon the surface of molten gold in casting, and which produces "tailness" in the ingot or bar, consists of some sulphur compound taken up from the gases from the fuel employed for fusing it. Copper also casts badly, as when in fusion it is constantly either taking up carbon or oxygen as the heat of the furnace is either a reducing or an oxidating one, and the great cleanness of castings produced from phosphorized copper arises from the presence of the small amount of that element precluding it from taking up carbon, on the one hand, and shielding it from oxidation on the other. Fourthly, a high melting point and a high specific heat are favorable to the production of perfect castings as prolonging the time during which, *ceteris paribus*, the metal filling the mold is subjected to its own hydrostatic pressure, thus more completely forcing it into sinuosities and expelling air bubbles or other gaseous matters. If the fusing point be very low, as in the case of lead or tin, the viscous point is so rapidly reached by the loss to the mold of the small amount of heat present in the metal that there is but little chance of air bubbles or particles of unreduced oxide being previously forced out. Fifth, the absolute amount of contraction of any metal between the temperature at which it is poured and that of the atmosphere, forms also an element in the perfect correspondence of the casting to the form of the mold in which it was cast. On comparing this rough sketch of some of the principal conditions upon which the degree of perfection of castings in various metals depends, it will be obvious that among at all the metals commonly used for castings in the arts, cast iron occupies an extremely favorable position; its density is sufficient to press it when liquid effectively into the mold, its capillarity is not very great, its range of viscosity is small, and it possesses the paramount advantage that whatever oxide may be formed in the casting processes is precluded from becoming diffused throughout the mass by the silicon and carbon present, and that any oxide formed on the surfaces in contact with the mold is instantly again reduced by the hydrogen and carbonic oxide evolved from the mold itself. In these conditions, indeed, cast iron may be said to stand unrivalled amongst metals in the perfection of the castings made from it, and they are quite sufficient to account for that perfection without calling in the now disproved supposition that it expands like ice at the moment of consolidation. The experimental determination of the specific gravity of liquid cast iron, adverted to at the beginning of this paper, affords us the means—and for the first time—of determining the total dilatation in volume as well as the linear dilatation of cast iron of the quality experimented upon, viz., the fine-grained, bright gray tough cast iron employed by mechanical engineers. As the specific gravities of this iron when cold and when melted were 7·170 and 6·650, so that the unit in volume when cold being taken as 1000, was increased to 1078·2 at the temperature somewhat above the melting point at which the iron was poured; the total dilatation in volume being thus 0·0782, and this divided by three—*i. e.*, neglecting all but the first term of the series—gives for the total linear dilatation 0·02606, which, taking the whole range of temperature between 60 deg. and 2400 deg., and if we assume the dilatation uniform throughout the range, gives a coefficient of dilatation of 0·0001086 for 1 deg. Fah. This, however, is not quite correct, as the rate of dilatation increases rapidly within a few degrees of the melting point. The dilatation found as above is also in excess of that due to the precise range between 60 deg. and the melting point of cast iron, the higher temperature in my experiment being somewhat above the melting point, exceeding it by probably about 200 deg. Fah., my direct object being simply to prove that melted cast iron is not denser—as has been stated—than the same cast iron in the solid state, and not that of ascertaining the exact dilatation due to the precise range between 60 deg. Fah. and the melting point; we are enabled, however, incidentally to deduce the latter with approximate accuracy. I must reserve, however, for a future communication some further remarks upon this part of the subject, as also upon the interesting phenomena of the movements observable in large masses of liquid iron, as in the largest crane ladles, which have been erroneously appealed to as affording proof that liquid cast iron is denser as its temperature is higher.

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For Sale, &c.

BY S. G. HENRY & CO.,
Assignee's Sale in Bankruptcy of the Real and Personal Property of the Louisville Steam Power Company.
Wednesday, October 14, 1874.

As Assignee of the Louisville Steam Power Company, bankrupt, I will offer at public sale to the highest bidder, commencing at 10 o'clock a. m. of Wednesday, October 14, 1874, upon the premises, northwest corner of Seventh and Dumesnil streets Louisville, Ky., a lot of ground 235 feet front by 156¾ feet deep to a 20 foot alley, together with the improvements, consisting of substantial brick building 50x160 feet, with engine room and other buildings attached, and the engine, boiler, machinery and fixtures of the establishment, all in complete order and ready for running. The property has been used as a manufactory of hot pressed nuts; the engine (12x24 inch cylinder) is nearly new, having been used less than six months; the boiler is of the best Tennessee iron and as good as new. There are four nut machines, lathe, planer, 4 blacksmith forges, three lines of shafting, water pipes connected with water company's mains, &c. Also machinists' and blacksmiths' tools, office furniture, and such other personal property as is usually found in shops of this kind.

TERMS.—On real estate and fixtures, bonds for equal payments at 6, 12, 18 and 24 months, bearing interest at 6 per cent., with approved security and lien retained to secure payments. On personal property bonds at 90 days (except for sums of $20 and under, which shall be cash), with approved security and like interest.
The property can be examined at any time by calling upon the undersigned.
STEPHEN E. JONES, Assignee.

To Rent.

First and third floors—together or separate. Brick building 125x50, well lighted and the best business location in the city. Light power will be supplied if desired, or parties can furnish their own if preferred. Address, with particulars,

H. D. STANLEY, Secretary,
Bridgeport, Conn.

FOR SALE.—AN UNFINISHED IRON, TWIN SCREW STEAM VESSEL, having double bottom and water-tight compartments.

Length between Perpendiculars	390 feet.
Breadth of Beam	45 "
Depth to Main Deck	24½ "
Displacement at 22 feet draught	6,000 tons.
Area of Midship Section	893 sq. ft.
Number of Transverse Bulkheads	7
ENGINES.	
Two pairs, each driving one screw.	
Diameter of Steam Cylinder	72 inches.
Stroke of Piston	45 "
Surface Condensers, area	12,560 sq. ft.
SCREWS.	
Diameter	18 feet.
Pitch	27 "
Number of Blades	3
BOILERS.	
Ten in number; ordinary Horizontal Fire Tubular Type.	
Total Heating Surface	28,000 sq. ft.
Grate Surface	875 "

This vessel was intended to be completed for the State of New Jersey as an Ironclad. The plans were prepared and the work was carried on under the direction of Gen. GEORGE B. MCCLELLAN, U. S. A. All materials and the workmanship are guaranteed to be of the best possible description.
The funds appropriated for the purpose of completing the vessel not proving sufficient, the Legislature of the State of New Jersey has directed that a sale be made to the highest bidder. A Commission, consisting of
His Excellency, Gov. JOEL PARKER, of Trenton,
Vice-Chancellor AMZI DODD, of Newark,
Honorable Messrs. W. W. SHIPPEN and S. B. DOD, of Hoboken,
has been appointed to effect such sale.
Bids endorsed "PROPOSALS FOR THE PURCHASE OF IRON STEAMER, OR OF PARTS THEREOF," may be addressed to the Governor of the State of New Jersey, by whom they will be received at Trenton, N. J., until 12 o'clock, M., on the second day of November next, at which time they will be publicly opened.
Blanks for proposals, and a pamphlet containing a detailed description of the vessel, as nearly completed, except as to armor and armament, may be obtained by addressing either member of the Commission or the undersigned.
Permission to examine the vessel, and to inspect the premises, may be obtained (by intending purchasers) on application at the Dry Dock, where the ship now lies, or to the Consulting Engineer to the Commission, who will be prepared to exhibit drawings, to explain the structure of hull and machinery, and to give any other information respecting the vessel.

R. H. THURSTON,
Consulting Engineer to the Commission, Hoboken, New Jersey, United States of America

FOR SALE.

An 8¼ inch mill train for making Merchant, Band and Hoop Iron. Will be sold cheap.
Apply to **W. W. JONES,**
Near the Lehigh Valley Railroad Depot,
Allentown, Pa.

FOR SALE.
At Lowest Manufacturers' Rates.
GUNS & SHEET ZINC,
Best German and Belgian Brands,
By ***LOUIS WINDMULLER & ROELKER,***
20 Reade Street, N. Y.

FOR SALE,

£1. German consular instructions in English, published by subscriber, who *translates* from and into the English, Spanish, French and German. Latest *translations* made for the Spanish Government, Pacific Mail Steamship Co., Walter A. Wood, Morris, Wheeler & Co., Todd & Rafferty, and John T. Dunkin, N. Y.; Wilder & Co., Savannah; and the Tanite Co., Stroudsburg; by

C. KIRCHHOFF,
Commercial Editor "El Cronista,"
Box 2806, N. Y.

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, Oct. 7, 1874.

During the past week the financial markets have developed strength, and the situation is generally healthy. There have been several commercial failures reported, which had no other effect than to give rise to rumors affecting the credit of other houses. The fall trade, after developing considerable activity, has again fallen off, and during the past week has not realized expectations. The money market has continued easy to borrowers on call, who are fairly accommodated at 2½ @ 3 per cent., with the exception of a spasmodic advance on Friday, when 5 per cent was exacted. Mercantile paper is quotable at 6 @ 7 per cent., which is somewhat higher than last week.

The bank statement shows an increase in loans of $1,727,600, which reflects the increased activity both in trade and at the Stock Exchange. The total reserve is $2,280,000 lower than last week, the principal decrease having been in legal tenders, of which the banks held on the average during the week $63,966,100, against $65,700,000 last week. The law on the showing of total liabilities calls for a reserve of $59,231,475, and the banks hold $82,340,300, or $23,108,825 in excess. The excess last week was $25,505,100. The following is a comparison of the averages for the past two weeks:

	Sept. 26.	Oct. 3.	Differences.
Loans	$279,539,400	$281,277,000	Inc. $1,737,600
Specie	18,919,900	18,374,200	Dec. 545,700
Leg. Ten	65,700,400	63,966,100	Dec. 1,734,300
Deposits	236,460,800	236,925,900	Inc. 465,100
Circulation	25,635,800	25,419,600	Dec. 206,200

The gold market is strong, and the rates charged for foreign exchange higher. On Thursday the Treasury sold $500,000 at 110·15 and 110·16. The following shows the daily range of the premium:

	Highest.	Lowest.
Thursday	110⅛	110
Friday	110⅛	110⅛
Saturday	110⅛	110
Monday	110⅛	110
Tuesday	110⅛	110⅛
Wednesday	110⅛	110

The stock market was strong, with advancing prices, until Monday, when the upward movement culminated and prices began to drop, declining on Tuesday from ⅛ to 2¼ per cent., and fully recovering to-day. There has been a good deal of speculative activity at times, with principal dealings in Western Union, Lake Shore, Union Pacific, Pacific Mail, Erie, Northwest and N. Y. Central.

Government bonds are strong here and abroad. State bonds are dull and in disfavor, but desirable railway mortgages are strong.

The following tables show the movements in foreign trade for the week:

IMPORTS.

	1872.	1873.	1874.
Total for week	$8,644,338	$7,764,447	$6,632,465
Prev. reported	334,879,178	308,211,676	302,940,607
Since Jan. 1	$343,223,411	$315,976,123	$309,573,072

Included in the imports of general merchandise for the week are:

	Quant.	Value.
Anvils	100	$1,126
Brass goods	13	1,892
Bronzes	63	18,108
Chains and anchors	89	3,991
Copper		101
Cutlery	126	50,490
Guns	64	11,569
Gun barrel molds	60	1,819
Hardware	40	3,159
Iron, pig, tons	560	22,969
Iron sheet, tons	116	17,991
Railroad bars	2,965	43,625
Iron cotton ties	1,336	3,866
Iron, other, tons	142	6,410
Lead pigs	7,996	44,153
Metal goods	200	21,082
Nails	9	907
Needles	26	10,039
Old metal		473
Per. caps	17	3,164
Saddlery	3	406
Steel	3,014	18,819
Spelter	111,996	5,305
Silverware	3	580
Tin, boxes	25,490	200,806
Tin, slabs, 807; lbs., 50,791		9,769
Wire	519	7,277
Zinc	331,500	19,536

EXPORTS EXCLUSIVE OF SPECIE.

	1872.	1873.	1874.
For the week	$4,716,438	$8,378,130	$6,866,219
Prev. reported	166,646,895	215,168,228	217,992,504
Since Jan 1	$171,363,343	$223,546,358	$224,858,723

EXPORTS OF SPECIE.

Total for the week	$220,459
Previously reported	42,404,045
Total since January 1, 1874	$42,624,504
Same time in 1873	42,062,192
Same time in 1872	57,974,805

Government bonds at the close were steady at the following quotations:

	Bid.	Asked.
U. S. Currency 6's	117¾	117¾
U. S. 6s 1881, reg	117¾	117¾
U. S. 6s, 1881, con	118	118¼
U. S. 1862, 5-20 reg	109¾	110
U. S. 5-20 1862, con	113¾	113
U. S. 5-20 1864, reg	111¾	111¾
U. S. 5-20 1864, con	115¾	113¾
U. S. 5-20 1865, reg	113¾	113
U. S. 5-20 1865, con	116½	116¾
U. S. 5-20 1865, reg. new	115½	115¾
U. S. 5-20 1865, con	116½	116¾
U. S. 5-20 1867, reg	116¾	116½
U. S. 5-20 1867, con	117¾	117¾
U. S. 5-20 1868, reg	116½	117¾
U. S. 5-20 1868, con	117¾	117¾
U. S. 10-40 reg	111¾	111¾
U. S. 10-40 con	111¾	112
U. S. 5s, 1881, reg	112¾	112¾
U. S. 5s, 1881, con	112¾	112¾

The following were the highest and lowest prices of stocks to-day:

	Highest.	Lowest.
N. Y. Cen. & Hudson Consolidated	101¾	101¾
Lake Shore	81¾	80¾
Rock Island	103¾	102¾
Delaware, Lack. & Western	107	106¾
Wabash	33¼	32¾
Western Union Telegraph	80¾	79¾
Northwestern	39¾	37¾
Milwaukee & St. Paul	34	33¼
" Pref	52	52
Panama	110¼	110¼
Pacific Mail	48¾	47¾
Erie	35¼	33¾
Ohio & Mississippi	28¼	27¾
Union Pacific	36¾	35
C. C. & Ind. Central	11	10¾
At. & Pacific pref	12	11¾
Hannibal & St. Joseph	25¼	25¾
Amer. Mer. Union Express	60¾	60¾

GENERAL HARDWARE.

Business has been light, as a general rule, since our last, and there seems to be no doubt that the trade for the season will fall very far short of the anticipations of most people. The changes in prices during the week have not been numerous.

The Stanley Rule and Level Co. issued a new list of Gauges, Oct. 1, fully illustrating the improvements now introduced into this line of their goods, and more particularly referred to by us in our issue of Aug. 6. Special attention is directed to a reduction now made in many Nos. of Bailey's Patent Adjustable Iron Planes. Eighty thousand of these Planes have already been sold, and their reputation as a time saving and labor saving tool is rapidly extending to foreign markets. The company now manufacture their No. 2 Screw Drivers with the patent metallic fastening, same as heretofore in their No. 1 Drivers. They have also become sole owners of the right to manufacture Magnetic Tack Hammers, and the goods will hereafter bear their labels. Discounts as per sheet of July 1, 1874, remain unchanged.

The following are the new list prices for Bailey's Planes:

Iron Planes.

No.		Each.
1.	Smooth Plane, 5¾ inches in length, 1¼ inch Cutter	$3·50
2.	Smooth Plane, 7 inches in length, 1⅝ inch Cutter	4·00
3.	Smooth Plane, 8 inches in length, 1¾ inch Cutter	4·50
4.	Smooth Plane, 9 inches in length, 2 inch Cutter	5·00
5.	Jack Plane, 14 inches in length, 2 inch Cutter	5·50
6.	Fore " 18 " " 2¾ "	6·50
7.	Jointer " 22 " " 2¾ "	7·50
8.	" " 24 " " 2¾ "	8·50
9.	Block " 10 " " 2 "	8·00
10.	Carriage Makers' Rabbet Plane, 14 inches in length, 2⅛ inch Cutter	6·00
11.	Belt Makers' Plane, 2¾ inch Cutter	4·00

The advertisement of L. Coes & Co., on our 28th page, has been changed this week. In its new form it explains and illustrates the improvements that have been lately made in their Wrench, by which it is made stronger and firmer. Horace Durrie & Co. are their sole agents.

The Hart, Bliven & Mead Mfg. Co. furnish us the following memorandum of recent changes in prices made by them:

Page.		Discount.
15,	Iron Bench Screws	60&10 %
175,	Angular Boring Machines, without augers	$4·00 each
175,	Angular Boring Machines, with augers	6·00 "
182,	C. S. Gimlet Bits	30 %
184,	Nail and Spike Gimlets	25&10 %
191,	Genuine Aiken Saw Sets	25&10 %
196,	Parr's Brad Awl Sets	35&10 %
222,	Reduce list on Bailey's Planes No. 1 to No. 8, inclusive	50c. each
302,	Manure and Spading Forks	30 %
303,	Hay Forks	30 %
305 to 323,	Hotchkiss' Curry Combs	20&10 %
329,	Wrought Iron Barrel Bolts	50, 10&10 %
347,	Broad Loose Joint Cast Butts	60&10 %
357,	Torrey's Door Springs	50&10 %
359,	Clark's Blind Hinges	55&10 %
366,	Strap and T Hinges	35 %
385 to 388,	Trunk Locks	15 %
412,	Wilmot's Base Knobs	30&10 %
422,	Sheet Brass	10 %
423,	Brass and Copper Wire	10 %
423,	" " " No. 26 to No. 38, add	10 %
424,	Bright and Annealed Wire No. 0 to No. 18	42½ %
424,	" " " Nos. 19 to 26	52½ %
	" " " Nos. 27 to 35	57½ %
	Coppered Wire, Nos. 0 to 18	30 %
	Tinned Broom Wire	25 %
	Galv'd Wire, Nos. 0 to 6, alter list to 10c. lb	3½ %
	" Nos. 7 to 18, alter list to 10c. lb. same as regular Wire	12½ %
435,	Halter and Coil Chain	gold, 20 %
462,	Stow's Staffers	10 %
473,	Glass Curtain Pins	52½ %
479,	Wooden Mouse Traps	45&10 %
481,	Imitation Newhouse Traps	30 %
484-489,	Chatillon's Balances	22½ %
494, 495,	Turnbull Scales	20 %
496,	Tea and Counter Scales	25 %
498,	Platform Scales	25&10 %
504,	Cork Lined Faucets	60&10 %
537,	Tea and Table Spoons	45&10 %
541,	Slates, by the case	65&10 %
541,	" less than case	65 %
547,	Tubular Lanterns	net

Nos.	00	0	1	15
	$10·00	11·00	14·00	10·50
	No. 13 Satellite.	Nonpareil.	No. 6 Vesta.	
	$5·00	6·00	8·00	

The prices of Rope have been reduced. The following is the new list adopted on the 6th instant, and subject to the usual discount to the trade of 1 cent per pound.

Manila Rope, ¼ in. and upward	15½ cts
" " ¼ and 5-16 in.	16½ "
" " ⅜ in.	16 "
" Hay Rope	16 "
" Lath Yarn	15 "
" Bolt Rope	17½ "
Sisal Rope, ¼ in. and upward	12 "
" " ¼ and 5-16 in.	13 "
" " ⅜ in.	12½ "
" Hay Rope	12½ "
New Zealand Rope, ¼ in. and upward	12 "
" " ¼ and 5-16 in.	13 "
" " ⅜ in.	12½ "
" " Hay Rope	13 "

The American Butt Co. have issued, under date of the 1st instant, a circular giving the following discounts for their goods. The price of Narrow Fast Joint Butts is advanced from 50 to 35 per cent, discount:

Narrow Fast Joint Butts	dis. 35 %
Broad " " "	50 %
Common Loose Joint Butts	60 %
Mayer " " "	50 %
Parliament " " "	50 %
Reversible Loose Pin Acorn Tipped Butts, Paneled	55 %
Reversible Loose Pin Acorn Tipped Butts, Paneled and Japan'd	50 %
Reversible Loose Pin Acorn Tipped Butts, Paneled and Japaned, with Nickeled Acorns	50 %

Parties whose net orders for Butts alone amount to $250 for each six months ending June 30th and December 31st of each year, will be entitled to a discount of 5 per cent. on net.

The prices of Wire have been reduced since our last. The following are now the rates:

Brass and Copper	dis 10 %
Bright and Annealed, Nos. 0 @ 18	dis 40 @ 45 %
" " Nos. 19 @ 26	dis 50 @ 55 %
" " Nos. 27 @ 36	dis 55 @ 60 %
Coppered Nos. 0 @ 18	dis 30 @ 32½ %
Galvanized, Nos. 0 to 6	market list net @ dis 5 %
Galvanized, Nos. 7 to 18	market list dis 10 @ 15 %
Tinned	dis 25 @ 30 %
Cast Steel	dis 15 @ 20 %
Tinned Broom Wire	dis 25 @ 30 %
Galvanized Telegraph, Nos. 8 and 9	℔ ℔ 9 @ 10c
" " Nos. 10 & 11	℔ ℔ 10½ @ 11½c
" " No. 12	℔ ℔ 10½ @ 11½c
Annealed Fence, Nos. 8 and 9	dis 40 @ 45 %
" Grape, Nos. 10 to 14	dis 40 @ 45 %
Fence Staples	℔ ℔ 8 @ 8½c

Russell & Erwin Mfg. Co. are agents for Perry's new Lever Sausage Filler, patented June last. This is a very simple and effective machine, convenient in operation and easy to clean. The pressure is applied directly, and with a powerful leverage. The price is $15 per dozen, less 15 per cent. discount.

Although nearly, if not quite all, the works are in operation, both East and West, and the demand has fallen off, there is not yet anything like a good supply of Nails in this market, nor will there be for some weeks. Prices are the same as last week. The regular quotation is $3·75, but an order of 200 kegs or over could easily be placed at $3·65.

In Foreign Hardware there has been no change, nor does any of importance seem likely. The tone of the English market is very firm, as the workmen resist stoutly any diminution of their wages, and with success, so far. Thus, though trade is very dull there, it has been found impossible to place orders as low as was at one time expected. The inducements to import have for some time been so slight that stocks here are not heavy, and anything like an active demand would soon break them, but they will very likely be sufficient for the demands of this season.

The premium in the Circular Saw Test at the Cincinnati Industrial Exposition, reported in our last issue, was awarded to Emerson, Ford & Co., of Beaver Falls, Pa.

We invite the attention of our readers to the advertisement of J. Clark Wilson & Co., on our tenth page. Beside a list of the goods for which they are sole agents, the advertisement shows a cut of Phillips' Self-Withdrawing Boring Machine, which they guarantee to give satisfaction in every respect and do one-third more work than any other in market. It is very ingeniously arranged to withdraw the Auger automatically as soon as the proper depth is reached. Of this Machine, J. Clark Wilson & Co. say in their new catalogue: "This Machine possesses advantages over others in many respects. The self-withdrawing of the Auger while in motion is perhaps the most noticeable; that is, the depth of the hole is readily set before boring commences, by means of the movable collar; and without watching to see when the proper depth is reached, or stopping the boring movement, the Auger returns of itself, and is ready for another hole. The boring of any number of holes to precisely the same depth, by once setting the gauge, is another very important point in framing, as it greatly facilitates the cutting of the mortise. The adjustable cranks give the workman greater command of power in using large or small bits, and in hard or soft wood; and being made of malleable iron, they are strong and durable."

The Russell & Erwin Mfg. Co. have a stock of Chapin's Rules, which they are offering at discount 70 and 5 per cent. The attention of our readers is also invited to their advertisement on our 20th page, offering Gold Medal Apple Parers at $5·75 per dozen. This is a very low price.

E. M. Boynton gave on Wednesday of last week an exhibition of what his Lighting Saw could do at the Pennsylvania State Fair, in which two men sawed through a sound oak log, 16 inches in diameter, in 17 seconds. Mr. Boynton informs us that his export trade is increasing, he having lately made large shipments of his Saws to Australia and other distant markets.

BRITISH IRON MARKET.

(Specially reported by cable for The Iron Age.)

WEDNESDAY, Oct. 7, 1874.

Scotch Pig.—During the week the quotations for makers' Irons have advanced over the figures last quoted by cable, and the market is now firm at the rise, apparently owing to a genuine shipping demand, the returns for last week showing a slight increase over the corresponding period of last year. The following are makers' prices:

Gartsherrie No. 1	118/
Coltness No. 1	118/
Glengarnock No. 1	107/6
Eglinton No. 1	96/

Manufactured Iron.—The market is quiet; prices are nominal, and quotations unchanged. Amount of business small.

Rails.—The market is dull; the demand is improving, but prices are weaker. But little business is doing. There is no change in quotations.

IRON.

American Pig.—The market for American Iron presents about the same features. Some of the companies are sold up, while others are overburdened with large stocks, and under the influence of necessity are compelled to accept low prices. $29 @ $30 may be considered a fair quotation for No. 1; $27·50 @ $28·50 for No. 2; while Forge varies from $23 @ $27. We do not hear of any sales of importance, the transactions of the week having been limited to small lots. The shipments from the Lehigh region have been in excess of those of July and August. This may be owing to the desire to get Iron forward prior to the close of navigation.

Scotch Pig—The stock of Scotch Iron is in such a narrow compass and the demand so small that full prices are obtained for what little is selling. The market abroad has advanced cons'derably, as will be seen by our cable advices in another column. Cable advices state that some brands, say Coltness and Summerlee, are not obtainable from makers before November. The shipments to foreign countries from Scotch ports by last advices were but 11,000 tons, and all appearances indicate that whatever decline takes place will be gradual. The furnaces in blast in 1874 were 113, against 123 in 1873. The warrants in store in 1874 were 18,688 tons, against 40,139 tons in 1873. As there is considerable excess of No. 3 in store, it will be impossible to make up 18,000 tons of warrants. This explains the great scarcity of No. 1. We quote Eglinton at $37; Carnbroe at $38; and Glengarnock at $39 @ $40.

Bars continue firm at 3c. The only noticeable feature of the market is the absence of cutting. There is a slightly improved demand from the Railroads, which will probably continue until the end of the year, as they can no longer postpone needed repairs.

Rails.—While there is no scarcity of inquiry for Rails, sales are still restricted, and prices show no signs of an upward tendency. Steel Rails are taking the place of Iron Rails to such an extent, and are so low in price, that the market for the latter is much depressed. We quote American $55 for Iron and $80 for Steel, at the mill, and foreign Iron $48 @ $50, gold.

Old Rails.—The market for Old Rails is in a very dull and uninteresting position. There is little, if any, demand reported, and values are wholly nominal. Old Ts are quoted at about $32.

Scrap.—There has been a little more doing the past day or two, and the value remains about the same. Sales of 500 tons from yard at $27·50, delivered free to vessel, 100 tons from the dock at $29·50, and 350 tons from an importer to a dealer on private terms.

METALS.

Copper.—A considerable amount of business has been transacted during the week, summing, altogether, between spot and futures, about 1,000,000 pounds, the latter up to January 1st, 1875. The Lake companies generally ask 24c. for January to May delivery, inclusive. Cash Copper has been sold all the way from 21¼c. @ 21⅝c., and nothing can now be had below the latter price. Futures have been paid 22c., November and December delivery, with nothing to be had at a less figure now for those months. The market shows buoyancy and strength at the close, the asking price for available Lake Copper being 21⅝c. @ 22c. For Baltimore 21⅝c. is asked, and 21½c. bid; the article is scarce, and holders keep out of the market. Summing up the domestic aspect of the metal, it is evident that there is a tendency toward higher figures, to which is superadded, by way of sympathy, the impulse we receive from Europe, where the market creeps up by degrees. We have letters to hand from London to-day, bearing date of the 26th ultimo. According to them Copper begins to be concentrated in few strong hands; thus, Chili Bars then stood £81. 2/6, and Best Selected, £90 @ £91, with sales made at the latter rate; while to-day we are telegraphically informed that Chili Bars are worth £82. 10/, and Best Selected, £91. The English improvement, it will have been noticed for some time past, runs on Chili Copper more particularly, attributable to the fact that for speculative purposes it is the most handy description, coming from a great distance, and thus being apt to be sold over and over again afloat. And the movements on the West Coast favor it just at present, the charters for the fore part of September having been but 1000 tons, as per cable to London. Our own Valparaiso correspondent writes, via Panama, under date September 1st, to the following effect: "Cable quotations from Europe are but two days old, and quote Chili Bars, £77. During the fortnight transpired since I last reported to you, the market opened at $16 per quintal of 100 pounds, Spanish, on shore here, and $16·62½ on board at Lota, at which prices there were sold 1814 quintals and 300 tons severally; and, furthermore, on private terms, 170 tons Ossa, but on receipt of the more favorable English advices, an improvement took place to $16·25 on shore, and $17 on board at Lota, upon which basis there have changed hands this day 300 tons Lota. There are buyers of Guayacan Copper in the market at $16·87½ on board. A cargo of Regulus sold at $7 on board yesterday. Nothing came to my knowledge in Ore. Total fortnight's sales of Bars 20,575 quintals, and of Regulus 13,000, the latter at $7 on board at Chaparal. I quote Urmenta, with a 60/ steam freight, $16·87½ on board; Lota, ditto, ditto, $17, with sales; and Bars, $16·25 on shore here offered; Regulus, 50 per cent., $7, with sales; and Ore, 25 per cent., $2·85 offered. Exchange, 60 days, 44¼d @ 44⅛d; ditto, 90 days, 44⅛d @ 44⅝d." The manufactures of Copper are firm, but unaltered, as follows: Yellow Metal Bolts, 28c. @ 30c.; New Sheathing Copper, 30c. @ 31c.; Bolts and Braziers, 32c. @ 33c.; and Bronze and Yellow Metal, 22c. @ 23c., net cash.

Tin.—This metal forms an exception from the rest, and is listless, with no feature in it. We have had but a dull week in it once more, very little transpiring in either "spot" Tin or "futures." Speculators are afraid of the English market and keep aloof, while importers of Straits Tin also feel less confident, and although they may prefer to hold on for some time longer to what they have in store, we apprehend that any attempt to force a sale "to arrive" of Straits Tin would bring down the price from ¼c. @ ⅝c. below the present spot figure, which is 21¼c. @ 21⅝c., gold, while we quote L. and F., 21¼c.; English Refined, 21½c.; and Banca, 25c. @ 25½c., all gold. London, per cable yesterday, quotes Straits, £92; L. and F., £95; and English Refined, £97. The Dutch sale of Sept. 29, of 22,300 slabs, went at 56½ guilders for Banca. By mail from London, dated 26th ultimo, we receive the quotation of £91. 10/ @ £92 for Straits, which has consequently remained steady during the interval, although closing flat on the 26th. The difficulties in the way of a sound and permanent recuperation in value have to be searched for in Australia, whose production is a nightmare to European holders. Some odd lots of Australian arrived at this port quite recently. We should get plenty of it direct, but for the dull trade in wool of late between Australia and this coast. With a revival of this traffic we may get a goodly share of Australian Tin for good stowage or trim of the clippers bound thence to New York and Boston. It is, in fact, but a matter of time, and we shall commence in good earnest to draw Tin from Australia, the great Tin producing country of the future. In Tin Plates nothing but a jobbing trade has been done, but it has been fair in extent for the week. We quote without change: I. C. Charcoal, $9·75 @ $10, gold, per box; I. C. Coke, $7·75 @ $8; Coke Terne, $6·75 @ $7; and Charcoal Terne, $8·75 @ $9, all gold.

Lead.—Not much has transpired in this metal during the week under review, the government being out of the market, and sales of Domestic confined to something like 60 tons at 6¼c., gold, all told. Dealers and consumers prefer to wait till government has fixed its price ere they accede to the present asking rate of 6¼c. @ 6⅜c., gold, for Domestic. A hundred tons Selby on the dock may probably still be bought at 6¼c., gold, while some Spanish that was placed on the market yesterday brought 6⅜c., gold, and an additional 100 tons previously, to arrive, 6⅜c., gold. The European accounts to hand per mail, dated London and Marseilles, Sept. 26, as well as those received per cable yesterday, are of a buoyant character. London, at that date, was £21. 15/ and £22 for English and stiff, while the cable heralds a 10/ advance since. Marseilles improved from 48f. for Spanish Lead to 50f. between the 19th and 26th ultimo, and in its extensive purchases the French government followed up the advancing market resolutely. After Russia bought some 15,000 tons four months ago, France commences to purchase, which looks very much like vigorous preparation for war. But these government purchases would in all likelihood have passed by without much notice being taken thereof, but for the growing scarcity of Lead on the other side, where Spain, the largest producer, well nigh has become a consumer merely, and the production in Central Europe is also decreasing. What we have more than ever to wish for under these circumstances is that our own production may go on increasing steadily, about which many have grave doubts just at present. Manufactures of Lead are steady at 8½c. for Bar, Pipe and Sheet, with 10 per cent. discount to the trade; Tin-Lined Lead Pipe, 16½c.

Spelter and Zinc.—Domestic Spelter sells with a good deal of steadiness at 6¾c., currency, at which the agents here seem to be limited as a minimum figure, while the tendency in foreign continues rather upward, the Silesians having increased their limits again ½c. We have a sale of 25 tons C. G. H. to advise at 6¾c., gold, and W. H. is firm at 7c., gold. The mail is in from Hamburg, and bears date of Sept. 24. The private Spelter report from that city reads as follows: "P. H. sold at Breslau at 7⅛ thalers; Hohenlohe refuses to sell except at higher prices; Kramsta has been offered for Hambro account 7 thalers, and declined. Here 2500 quintals Silesian Union sold at 23 marks." The writer winds up his letter by raising his limit ½c. for any further "to arrive" sales to be effected at New York. Sheet Zinc at New York is quite scarce, and sells in a small way at 8¾c., gold, no large lots being procurable; Mosselman, 9c., gold, asked.

Antimony.—No special feature has arisen in this metal, which is steady, with moderate dealings, at 11¼c. @ 11½c., gold.

COAL.

Business in this market has been very quiet this week, which is generally the case at the beginning of the month. Prices, however, remain firm at the advance noted in our last report. The regular monthly increase of prices will take place in November as usual, after which there will be no more advance for the season until spring prices are fixed again. The associated Coal companies will no doubt continue the same programme next year as they have heretofore. This will be of some advantage to purchasers, as they can act and be governed by it accordingly. Anthracite is selling by the cargo at $5·40 @ $6 per ton.

The following are the prices charged for Coals mined by the Philadelphia & Reading Coal and Iron Company, deliverable on board vessels at Port Richmond, Philadelphia, for the month of October. The Company reserve the right to withdraw or change these prices at any time during the month, except on sales made prior to such changes:

	Lump.	Steamer.	Broken.	Egg.	Stove.	Chestnut.
	$	$	$	$	$	$
Hard White Ash Coal	4 90	5 00	5 10	5 25	5 75	4 30
Free Burning White Ash Coal	4 90	5 00	5 10	5 25	5 75	4 30
Schuylkill Red Ash Coal			5 25	5 35	5 80	4 40
Alaska Red Ash Coal			5 10	5 25	5 75	4 30
Shamokin Coal				5 25	5 80	4 45
North Franklin Coal			5 70	5 70	5 75	4 45
Lorberry Coal			6 05	6 05	6 05	4 65
Lykens Valley Coal				6 70	6 70	5 25

The market for Bituminous Coal is very dull, and there is no change to report. The quotations are as follows: Cumberland, $6·25 @ $6·75; American Gas, $7 @ $7·75; West Virginia, $7·50 @ $8; Pennsylvania and Westmoreland, $7·50 @ $7·75; American Cannel, $13; James River Steam, $6·25.

The following are the prices in gold for Nova Scotia Coals delivered at the shipping ports for the month of October:

Block House	$2·25	Little Glace Bay	$2.00
Lingan	2·25	Caledonia	1·88
Sydney	2·25	Slack from 75 to 80 cents.	
Pictou	2·50		

Freights to New York $3·75 to $4; to Boston $3·75. Duty 75 cents per ton, gold.

The inquiry for foreign is moderate, and prices are nominal. Our quotations are; Liverpool House Cannel, $18 @ $19; Liverpool Gas, $11; Newcastle Gas, $7·50 @ $8; Scotch, 9.

The quantity of Coal sent from the Pottsville region for the week ending Oct. 2, 1874, was 106,035 tons by rail; by canal, 25,395—for the week, 131,430 tons, against 116,781 for the corresponding period last year. Increase, 14,649 tons.

The supply sent from all the regions for the week was 433,293 tons Athracite, and 71,048 tons Bituminous—total, 504,341 tons, against 562,078 tons for the corresponding week last year. Decrease, 57,736 tons.

The whole supply sent from all the regions so far this year is 15,892,317 tons, against 17,072,062 tons to same period last year. Decrease, 1,179,745 tons so far this year. The decrease in Anthracite is 1,358,416 tons.

The Coal transported over the Cumberland Branch Railroad during the week ending October 3, 1874, amounted to 4904 tons, as against 6370 tons shipped in the corresponding period of last year, showing a decrease of 1466 tons. Over the Cumberland and Pennsylvania Railroad, for the same period, the shipments were 43,420 tons, against 59,590 tons shipped in 1873, a decrease of 16,170 tons.

IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending October 6, 1874:

Hardware.

Brown Wm.
Anvils, 2
Brooks & Co.
Nails, bags, 24
Boker Hermann & Co.
Chains, cks., 3
Guns, cs., 3
Casks, 13
Eaton E. E.
Packages, 2
Feldmann, Riechmann & Co.
Cases, 20
Friedmann & Lauterjung
Cases, 8
Field A. & Co.
Chains, cks., 50
Mdse. pkgs., 19
Harmar, Hayes & Co.
Packages, 3
Jackson R. D.
Packages, 2
Laughland & Co.
Wire, bales, 2
Merchants' Dispatch Co.
Cases, 8
Phelps, Bloom & Brown,
Cases, 1
Tillotson L. G. & Co.
Wire, lots, 287
Turnor R. A.
Chains, cks., 55
Packages, 3
Van Wart & McCoy,
Casks, 1
Van Wagoner & Williams,
Mdse. pkgs., 1
Woodford W. O.
Iron wire, bags, 32
Ward A.
Mdse. pkgs., 4

Iron.

Downing J. S.
Scrap, tons, 8
Echeverria M. & Co.
Scrap, pkgs., 1
Henderson Bros.
Pig, tons, 100
Laughland & Co.
Hay bands, bales, 600
Morton, Bliss & Co.
R. R. bars, 1622
Naylor & Co.
Rails, 1007
Naylor & Co.
Fish plates, bdls., 63
Mdse. pkgs., 220
Phelps, Dodge & Co.
Sheet, pkgs., 3000
Rammelsburg Charles & Co.
Bars, 19,391
Scrap, cs., 2160
Trowbridge D. & Co.
Tons, 51
Wheeler E. S. & Co.
Bundles, 459
Order.
Pig, tons, 300
Sheet, pkgs., 1688
Band, bdls., 662

Steel.

Brown Wm.
Bundles, 47
Cases, 11
Hogan John,
Bundles, 24
Cases, 20
Casks, 2
Naylor & Co.
Rails, 2061
Prosser Thos. & Son,
Tires, 4
Providence Tool Co.
Cases, 6
Robbins C. & Son,
Cases, 3
Bundles, 17
Woodford W. O.
Cases, 55
Order.
Rods, 173
Bundles, 168

Metals.

Bruce & Cook,
Tin plates, bxs., 640
Byrne Joseph,
Mdse. pkgs., 595
Huscbo B.
Lead, pigs, 2000
Phelps, Dodge & Co.
Tin plates, bxs., 10,502
Bundles, 4443
Windmuller L. & Roelker
Sheet zinc, cks., 30
Order.
Tin, slabs, 519
Tin plates, bxs., 1465

OLD METALS, PAPER STOCK, &c.

The market for Old Metals, Rags and Paper Stock has been very dull this week, and prices remain the same as quoted in our last, with the exception of White Linen Rags, No. 1, and Grass Rope, which have declined ¼ cent per pound. The demand for Old Metals continues very light. Dealers will not lower their selling price, and the market is heavily overstocked. We quote the following as the current purchasing rates:

Old Metals.—Copper, 15c. @ 16c. per lb.; Yellow Metal, 11c.; Brass, 10c. @ 12c.; Composition, heavy, 13c. @ 14c.; Lead, solid, 5½c.; Tea Lead, 4c.; Zinc, 4½c. @ 5c.; Pewter, No. 1, 19c.; do., No. 2, 8c. @ 12c.; Spelter, 5c. @ 5½c., Wrought Iron, 1¼c.; Sheet do., ½c.; Cast, do., ¼c. @ ¾c.; Machinery, do., ¾c.

Rags, &c.—Canvas, Linen, 5c. @ 5½c.; do. Cotton, No. 1, 6c. @ 6¼c.; No. 2, 2¾c.; White, No. 1, 6¼c.; No. 2, 4c.; Colored, do., 2c. @ 2½c.; Mixed, Woolen, 2c. @ 3c.; Soft, do., 4½c. @ 5c.; Gunny Bagging, 1c.; Jute Butts, 1¾c. @ 2c.; Kentucky Bagging, 3c.; Book Stock, 3c.; Waste Paper and Scraps, 1½c.; Kentucky Bale Rope, 4c.; Oakum Junk, No. 1, 4½ @ 5c.; do. No. 2, 3c.; Tarred Shaking, 1c. @ 1¼c.; Grass Rope, 2¾c.

PHILADELPHIA.

PHILADELPHIA, Oct. 6, 1874.

The market presents no new features for the week under review, save some slight improvement in Manufactured Irons. There is not the slightest speculative feeling noticeable, and any improvement must come from increased consumption. How far this may be expected is the problem now exercising the minds of producers. The only thing which seems at all certain is that prices of Pig metal cannot go much lower, if any, without greatly restricting production. The business doing, while perhaps in absolute deliveries not so much less than at this date last year, is at very low prices, frequently under published quotations. In Manufactured Irons things are better, with a fair business in Rails, Sheet and Plate, and somewhat more orders for Bars. From this little spurt in rolled Iron may possibly come a stronger demand for Forge Pig. The transactions in these lines of Manufactured Iron have been more considerable than for some weeks, but at prices previously quoted. Rails are fairly active for the season, and the demand must steadily increase from this on, as so many railroads are in absolute need of repairs.

Prices are without change, as the following quotations indicate:

PIG METAL.—No. 1 Foundry, $30; No. 2, $26 to $28; Gray Forge, $25 to $27; White and Mottled, $20 to $22.

CHARCOAL PIG METAL.—Cold Blast Car Wheel, $40; Hot Blast $36 to $38.

BARS—3 cents per lb.

OLD RAILS—$30 to $32.

SCRAP—$33 to $34 for No. 1 Wrought, as to selections.

Among the sales we are quoted the following transactions: *Pig Iron*—3500 tons No. 2 Foundry and White and Mottled; 1500 tons No. 1 and 2 Allentown, Phillipsburg delivery. Sales of C. B. Charcoal Pig at $37·50, at furnace, Pennsylvania. *Rails*—3000 tons Steel to Central Pacific Railroad, by Cambria Company, omitted last week; 1000 tons, $58, at mill, West. *Old Rails*—1500 tons, $31·50, delivered at Allentown, 6 mos.; 1550 tons Old Rails, superior lot, $33·50, spot. *Scrap*—700 tons at $33.

PITTSBURGH.

PITTSBURGH, Oct. 5th, 1874.

PIG IRON.—The general position of the market has varied but little for some time, and about the only feature worthy of notice during the past week is a slightly increased volume of business; however, the demand is still restricted entirely to supplying immediate wants, as the mills are still adhering to this policy, while as regards prices there has been no quotable change recently. I am informed by commission merchants that producers who a couple of months ago were unwilling to sell in expectation of being able to realize an advance, are now anxious to dispose of some of their product, although there is no effort being made so far as I can learn, to force the market, and any attempt of this kind just now could not but have a very depressing influence. Hence, commission men, notwithstanding they are pretty well loaded and are anxious to sell, are not disposed to force the market, knowing as they do that sales cannot be effected except to those who are forced to buy, and their policy is to let those who are in actual need of Pig go to the seller, instead of the latter soliciting the former. It is pretty safe to conclude, especially in the present condition of affairs, when a buyer enters the market now he means business, and consequently the seller knows how to act and talk; but when the seller is forced to enter the market and solicit buyers, he is, as it were, groping in the dark, as he does not know who are, and who are not, in need of the article. Prior to the panic it was customary for the mills to carry from 30 to 60 days' stock ahead, but now they are buying from week to week; consequently, anything like a round lot could not be disposed of, unless an inducement in the shape of a very low price or long time was held out. Prices, however, remain unchanged. Gray Forge, $26 to $26·50, 4 months; No. 1 Foundry, $28 to $29; No. 2 Foundry, $26 to $27; White and Mottled, $24 to $25. Foundry Irons have been exceedingly dull all season.

MANUFACTURED IRON.—Trade in all kinds of finished Irons, while it is not perhaps as brisk as it was prior to the recent advance, is about all that can reasonably be expected under existing circumstances, and while orders are not coming forward so freely, the mills appear to have about all they can do, the best evidence of which is they are nearly all in operation, and some of them are working double turn. The most encouraging feature to note is that prices are sustained, and, furthermore, if our manufacturers are not turning out as much Iron as they did in the early part, there is reason to believe that they are making more money, as current rates, so it is said, afford a fair margin for profit. The demand for Sheet Iron holds out well, some makers report that they are sold from thirty to sixty days ahead of production, and there is not much doubt, notwithstanding there is considerable apprehension in regard to the future, but what the mills will have all they can do during the balance of the year.

NAILS.—The Nail trade continues very unsatisfactory, and according to present indications there is but little prospect of an improvement this side of January, if then. Notwithstanding, even at card rates, which are adhered to, and which afford little or no margin for profit, the demand is light. Some of the factories report that their orders are not much more than equal to one-half of their production, hence a curtailment is almost certain, as makers here are unwilling to accumulate any stock in the present unsatisfactory condition or affairs. It is hoped and expected that business will revive about the 1st of the year, but the indications just now are not very flattering, so far as regards the balance of the year.

STEEL.—The Steel trade continues fairly active, and while it is not all that could be desired, it is all that can reasonably be expected. All the mills here are in operation; some of them are still sold considerably ahead, and the complaint is not so much for a want of business as it is in regard to prices, which it is said have been run down lower than there was any necessity. The card has not been changed for several months, but then it is a dead letter, as each firm appears to operate independent of each other in this respect.

SCRAP IRON.—The Scrap trade continues very dull. Dealers here say that it is not as good now as it was in the spring and summer, and while they are still hopeful that there will be a change for the better between now and close of the year, the outlook just now is not very encouraging. Prices are entirely nominal; indeed, there is scarcely enough doing in this market to establish quotations.

The Pittsburgh *Commercial*, of the 3d inst., says: Dullness continues the leading feature of the market for crude Irons. Receipts continue fair, but the sales during the week have been light. There is not the slightest semblance of a speculative movement, and nothing but an increased consumption demand can be looked for to impart buoyancy to the market. In no respect does the prospect look encouraging for the Iron trade, and we anticipate its being conducted on an unusually conservative basis for some time to come. Sales will be confined rigidly to the legitimate wants of the trade. We are reported the following sales:

BITUMINOUS COAL SMELTED FROM LAKE SUPERIOR ORE.

200 tons gray forge	$26·50—4 mos.
200 tons white and mottled	24·00—4 mos.
100 tons gray forge	26·50—4 mos.
70 tons open gray forge	27·00—4 mos.
50 tons white and mottled	24·00—4 mos.
30 tons No. 1 foundry	28·00—4 mos.
30 tons gray forge	26·50—4 mos.
20 tons white and mottled	24·50—4 mos.
20 tons No. 2 foundry	27·00—4 mos.
20 tons mottled	25·00—4 mos.
20 tons white	26·50—4 mos.
20 tons gray forge	26·50—4 mos.
10 tons No. 1 foundry	29·00—4 mos.

CONNELLSVILLE COKE.

200 tons gray forge	$26·50—4 mos.
50 tons gray forge	25·50—cash.
10 tons No. 2 foundry	27·50—4 mos.

ALLEGHENY COKE.

200 tons gray forge	$28·00—4 mos.
100 tons gray forge	28·00—6 mos.
60 tons white	26·00—4 mos.

HANGING ROCK CHARCOAL.

52 tons No. 2 foundry	$24·00—4 mos.
25 tons No. 2 foundry	31·00—4 mos.
25 tons No. 1 foundry	35·00 @ 37·00—4 mos.

ANTHRACITE.

60 tons No. 3 foundry	$26·50—4 mos.
20 tons No. 2 foundry, at furnace	26·00—cash.

IRON MOUNTAIN ORE.

100 tons ore	$12·50—4 mos.

LOUISVILLE.

Mr. GEO. H. HULL, under date of Oct. 5, writes us as follows: The market is dull, but without quotable change. The usual time, 4 mos., is allowed on the quotations below:

HOT BLAST CHARCOAL.

No. 1 F'dry, from Hanging Rock Ores	$30·00 @ 33·00
" 2 " " " "	28·00 @ 29·00
" 1 Forge, " " "	26·00 @ 27·00
" 1 F'dry, from Tennessee Ores	28·00 @ 30·00
" 2 " " "	27·00 @ 28·00
" 1 Forge, " "	26·00 @ 27·00
" 1 F'dry, from Alabama Ores	28·00 @ 30·00
" 1 " " Iron Mountain Ores	32·00 @ 34·00

HOT BLAST STONE COAL.

No. 1 F dry, from Missouri Ores	30·00 @ 33·00
" 2 " " " "	28·00 @ 29·00
" 1 Forge, " " "	28·00 @ 30·00

COLD BLAST CHARCOAL.

Car Wheel from Hanging Rock Ores	50·00 @ 54·00
" " Tennessee Ores	45·00 @ 46·00
" " Alabama Ores	48·00 @ 50·00
" " Georgia Ores	48·00 @ 50·00
" " Missouri Ores	48·00 @ 50·00
" " Kentucky	45·00 @ 46·00

CINCINNATI.

Messrs. L. R. HULL & Co., under date of Oct. 5th, write us as follows: The market continues quiet and generally unchanged. Concessions would be made from quoted prices on some grades of metal, if sales of round lots could be effected. Forge Irons are dull, and the mills having fair stocks are not in the market. Car Wheel Irons are still depressed. No. 1 Foundry is in moderate demand, and prices steady.

HOT BLAST CHARCOAL.

Hanging Rock No. 1, ₩ ton	$32·00 @ 33·00—4 mos.
" " No. 2	29·00 @ 31·00—4 mos.
" " Forge	27·00 @ 28·00—4 mos.
Tennessee No. 1	30·00 @ 32·00—4 mos.
" Forge	27·00 @ 28·00—4 mos.
Alabama No. 1	30·00 @ 31·00—4 mos.
Missouri No. 1	32·00 @ 33·00—4 mos.
" No. 2	29·00 @ 31·00—4 mos.

HOT BLAST STONE COAL.

Missouri No. 1 ₩ ton	$31·00 @ 32·00—4 mos.
" Forge	27·00 @ 28·00—4 mos
Ohio No. 1	29·00 @ 30·00—4 mos.
" Forge	26·00 @ 28·00—4 mos.
Scotch Pig, No. 1	

COLD BLAST CHARCOAL.

Hanging Rock Car Wheel ₩ tn.	$45·00 @ 50·00—4 mos.
Missouri " "	45·00 @ 50·00—4 mos.
Kentucky " "	45·00 @ 50·00—4 mos.
Tennessee " "	45·00 @ 48·00—4 mos.
Georgia " "	45·00 @ 48·00—4 mos.
Alabama " "	45·00 @ 48·00—4 mos.
Machinery and Forge	40·00 @ 45·00—4 mos
Bloome	90·00 @ —4 mos.

BOSTON.

OCT. 3.—*Pig* is without a precedent for its present listlessness. The sale of a five or ten ton lot to half a dozen near-by foundrymen seems to embrace all the business of the week, but the prices, as two of the sellers quote it "are altogether too low to print." *Bar* is selling a trifle better to blacksmiths and machinery jobbers, at the basis of 3c. per pound. We notice a fair demand this week for Boiler Plates and Flues which are going to repairs, and the placement of several orders for Boiler Iron on new work. In the fine grades of Yorkshire Iron, such as the Taylor and Lowmoor, prices are well maintained, for the reason that the manufacturers had not advanced to the full limit, and feel little disposition now to concede anything. Lots from store are quoted at 11c. *Steel* is very slow, and 9½c. to 10c. is the going value on Machinery. English Tool Steel is firm at 17½c. out of store, and 17c. on orders. *Copper* is ¼c. higher, and firm but very dull. We quote Ingot at 21¼c., cash. Sheathing, 33c.; Yellow Metal, 23c. *Lead* is firm and quiet. We quote Sheet and Pipe 8½c., currency; Tin Lined Pipe, 16½c.; Bar Lead, 8½c., less usual trade discount; Pig, 7½c. for Foreign, gold, and 6½c., currency, for Domestic. *Spelter* is easy. American, 6¾c., currency. *Tin* is dull and lower. Straits, 21¾c. to 22c.; Banca at 25½c., gold, 30 days; Refined English, 21¾c. to 22c., gold; Charcoal I. C., $11·25 @ $12·50; Coke, $9 to $10; and Terne at $8·50 to $12·50 per box, currency.—*Com. Bulletin.*

FOREIGN.

FRANCE.

(Moniteur des Interets Materiels.)

PARIS, Sept. 20, 1874.—*Metals.*—There is a more cheerful feeling in the European metal markets, which has been growing by degrees during the summer time, and is now evidenced by firmness and a rising tendency in the leading metals; speculation favors this drift toward enhanced values, but its participation in the movement is by no means prominent, hence the soundness which from all appearances underlies it. It is the rallying of legitimate consumption from a prolonged paralyzation that had been brought about by excessive production in the various branches of the metal trade, and all that remains to be hoped for is, that we may not soon return to the erroneous policy that had been indulged in of going on during a series of years, and piling up immense stocks, here and abroad, of articles that can be dispensed with, or whose consumption can be reduced, not being necessaries of life. The lesson which the past twelve months taught the industrial classes of Europe and America has been a rude but a wholesome one, not to be forgotten in a day or a year. The recovery now taking place upon the basis of a curtailed production may consequently be set down as essentially healthy, and likely to last. It is to be hoped that consumers will resolutely set their face against excessive speculation, limiting their purchases to actual requirements, rather than lend their countenance to the machinations of temporary would-be monopolists. The consumptive demand for *Copper* being fair, both in England and on the Continent, the tendency of values has remained steadily upward, assisted as it was by rather favorable statistics and some speculation. Some business has been transacted in this city at 216 francs for Tough Cake; ordinary Chili Bars command between 205 and 206·25. The market closes at the following rates for delivery at Havre: Chili Bars, 207·50; Common do., 204·50; Ingots, 220; English Tough Cake, 214; and pure Corocoro Ore, 202·50. Havre itself has been comparatively listless, and quotes nominally: First brands, 210; good current, 207; and Lota and Urmeneta, 204 francs the 100 kilos. Copper is well sustained at Marseilles on the basis of 220, Refined Chili Ingots. *Tin.*—The European markets have further improved, Holland leading the movement, which seems to have a sound basis to rest upon, as consumption has been and is still active in laying a good supply at the moderate rates still ruling. And, beside, Banca Tin at 58⅛ guilders in Holland cannot be called dear, having stood 70 at the commencement of the year, and ranged between 85⅛ and 87⅛ two years ago, and at one time in 1872 as high as 96 guilders. If then this metal has become statistically manageable once more, we see no reason why it may not be viewed as being pretty safe at the prevailing comparatively moderate figures. The only check on any very vigorous upward start it might take would be the renewal of large Australian shipments. Meanwhile we are better again at this center, and quote Banca, deliverable here or at Havre, 258 francs; Straits, 245, and English, deliverable at either Havre or Rouen, 242·50. Tin is as yet quiet at Marseilles, but can hardly avoid following in the wake of the ruling markets; Banca, there, still remains 250. The rising tendency of *Lead*, alluded to by us on former occasions, has at length taken a more decisive step onward, and a solid advance has been established both in England and on the Continent, mainly due to the crippled condition of mining enterprise in the Iberian Peninsula. Stocks have run low for some time past, and are alarmingly light at present, while consumption remains steady. We have had a 50 centimes improvement here on the various sorts, Spanish and English commanding 53 francs the 100 kilos, with a brisk demand for available lots. Marseilles is also in an improved position, but unaltered. *Spelter*—The same as Lead, has been in good request at rising prices, in part due to the light stocks, especially in England, and in part to the moderate quantities that are being mined in and forwarded from the Silesian Mountain regions, while the inquiry for France has remained unchecked at Breslau. Thus we have had dealings here all the way from 57·50 to 58·50. *Iron.*—We take much pleasure in confirming our previously expressed good opinion of the future which awaits Iron industry in France, the amelioration therein being steady, and with the exception of the department of the North, all our districts of greater importance seem contented with the headway they are making. No rise in prices of Pig Iron can be announced, but the same remains invariably firm. Experiments have of late been made with steel guns in France, going to show the great perfection we are attaining in the manufacture of field pieces; thus 2000 shots have been fired from the same piece without showing the least trace of deterioration even where the heaviest charges of gunpowder had been tested. *Coal.*—The North has been steady, and stocks have been rapidly diminishing, while the Loire is still weak and nominal, except so far as Coke is concerned, which is scarce at 35 to 40 francs. Paris is remarkably quiescent.

BELGIUM.

(Le Commerce.)

BRUSSELS, Sept. 19, 1874.—*Iron*—We have received official confirmation of the fact that our government has made a contract with the J. Cockerill Co. for the delivery of 10,000 tons of Steel Rails, with the Sclessin Society for 5000, with the Angleur Steel Works for 10,000, and adding thereto the 4000 bought of the Rhenish establishments at Ruhrort, and we have the grand total of 29,000 tons. The German tender of the Ruhrort people of 260 francs per ton, our domestic establishments have, of course, had to subscribe to also. Our Belgian statesmen have taken a great step to the good of the country in thus deciding that Steel Rails shall supersede Iron in our railroad system. Now that steel has come down to a comparatively cheap figure, nobody will dispute the advisableness of this great measure. Since on some minor branches in the Coal region Iron will do as well, however, 6000 tons will be taken at the maximum of 210 francs per ton; this has soothed down a little the apprehensions of some of our Iron Rail makers. But as this is but a trifle the latter will have the unpleasant reflection brought home to them that a transformation of their establishments to the manufacture of Steel Rails has become imperative. The general Iron market in Belgium has been devoid of any changes of moment during the week. Orders have been steady for the minor articles of manufacture, but they are far from being large ones, and afford no safety as regards a continuance of work. Sheet Iron manufacturers and Nail makers are doing well. *Coal.*—The government, in inviting tenders for the Coal it requires, has given but five days' notice, so as not to leave time to the companies for some concerted action, and at the same time give them the benefit of an exclusion of foreign competition. It is generally admitted that the range will be between 12 and 16 francs for the two qualities. There will be a better supply of colliers, the brick makers who had emigrated for the summer time returning to work in the Coal mines. Some hopes had been entertained by our companies that a 40,000 collier strike would take place in England, but it seems that the difficulties there have been bridged over. Should no strike occur in England, we do not see how a great fall in prices there can be avoided, which, in its turn, would bring down prices in our own midst. It will be seen from the foregoing that the Coal question among us is as perplexing as it possibly can be.

GERMANY.

(Borsenhalle.)

HAMBURG, September 21, 1874.—*Copper.*—Some good business has resulted during the week in the German markets. Prices have, in consequence thereof, become firmer, and the outlook is an improved one. There is a well sustained market at Berlin, where good qualities English and Australian command 29¾ to 30 thalers the 50 kilos. No change is noticeable here. We quote Lake Superior, 87⅜ marks; Drontheim, 88 to 89; and Refined Ingots, 110. *Tin.*—The German markets are firmly sustained. We are steady here at unchanged prices, while Berlin also bears up well. Banca at 34¾ to 35 thalers, and English at 33 to 33¾. The metal is firm at Stettin at 35 to 38. *Lead.*—There is great steadiness in the German markets. At Berlin, Hartz, Tarnowitz and Saxonian are wanted at 7¾ to 7⅞ thalers the 50 kilos. Spanish at Stettin is 7¾ to 8, and German 7⅞. Great firmness characterizes our own market, and we are able to quote German 23·50 to 24; English, 23·50; and Spanish, 25. Russia is also well supported at 26¾ roubles the 164 kilos at St. Petersburg. *Spelter.*—The favorable attitude which this metal has of late assumed has undergone no modification, and Berlin remains well sustained at 7¾ to 8 thalers for Silesian the 50 kilos; Stettin is steady at 7⅝ to 7¾, and Breslau quotes 6¾ thalers for September delivery. An active business has been done here, 3000 quintals selling, to come by rail, at 22·30 marks, good brands Silesian, and 1000 C. G. H., deliverable at Stettin, at 22·50, cash.

HOLLAND.

(Koch & Vlierboom.)

ROTTERDAM, Sept. 22, 1874.—*Tin.*—The tendency remains a strong one. Spot Banca has been done at 58¾ and 58 guilders the 50 kilos, delivery from the impending sale of the 29th instant, at 57⅜ and 57¾, and Billiton afloat by steamer at 55½.

EAST INDIES.

(Gilfillan, Wood & Co.)

SINGAPORE, August 6, 1874.—*Tin.*—A moderate business was done early in the fortnight at $25·37½ to $25·25 for Malacca, but at closing the market is very dull at $25 per picul. Stocks are moderate. Shipments to the United States during the first seven months of 1874, 30,183 piculs, against 19,220 in '73, and 31,968, 21,287, 28,464, 20,020 and 14,004 in '72-'68. The Crest of the Wave and Olivia Davis, for Boston and New York, have cleared, the one with 500, and the other with 1299 piculs Tin. Exchange, 4/2¼.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

SHEFFIELD, Eng., Sept. 21, 1874.

THE STATE OF TRADE,

generally, has still a healthier appearance, from a superficial point of view, and it must be admitted that even after making considerable allowance for purely local fluctuations, and the spurt consequent upon the approaching close of the Northern shipping season, there is an upward movement in the iron trade in point of production, accompanied by distinctly fairer prospects. At present, however, it would appear to be the heavier departments of the iron trade and the Bessemer rail branch which are mainly affected. Several causes have led to what we now observe to be occurring, the most potent being the recent gradually diminished figures which have been quoted for castings, some classes of forgings and Bessemer rails. Some manufacturers entertain the idea that there is not that general slackness of foreign and American demand which we have lately so heartily bemoaned, and put forward the plausable theory that we are being almost universally undersold, both on the Continent and States. They are, certainly, unable to display a very broad basis for their theory, but, on the other hand, their premises are well marshalled, and it is by no means easy to disprove their arguments. It is, of course, not my intention to attempt anything of the kind. I am simply, in this respect, putting before you certain matters which have come to my knowledge, and am well content to leave each individual reader to form his own conclusion. Personally, I think there is a little good ground on both sides, and I believe, further, that not only is there a slightly better home and colonial demand, but that by the drop in quotations England is again able to secure orders on her old footing—that of being able to supply as good an article as can be procured elsewhere, and at as reasonable a price. These are the only two conditions ruling the vexed question of demand and supply here.

BRITISH GOVERNMENT COAL MINE INSPECTORS.

From a parliamentary return, issued on Friday, I gather that Mr. F. N. Wardell, the government inspector of the coal mines which are situate in what is known as the Yorkshire district, has 491 mines and 1200 pits under his charge. His salary is £625, his last years' traveling expenses were £210. 6/11, and his personal allowances £151. 1/11. The assistant inspector had £300 salary, and £249 as traveling and personal expenses in 1873. Another assistant had £65 salary, and £31 as expenses. The three altogether made 156 underground inspections, and 326 visits. The Lancashire district inspector has 499 mines and 928 pits under his control. His salary reached the goodly figure of £1035, and his expenses, with allowances, were £341. His first assistant had £283 salary, and nearly £200 as expenses. The inspector made 52 underground inspections and 241 visits, and the assistant 129 underground inspections, beside 363 visits. The Durham inspector has 235 mines and 290 pits; the Northumberland inspector 221 mines and 280 pits; and the Staffordshire inspector 450 mines with 2000 pits. These figures afford a fairly reliable data as to the development of this great British industry, but we cannot ascertain what the increase in production is until the issue (in a couple of years or so) of the cumbrous mines statistics. We thus observe that in three districts alone (excluding all Scotland, South and North Wales, Shropshire, Worcestershire, Leicestershire, Warwickshire and Derbyshire) there are 1400 mines and over 3500 pits devoted to the production of the black diamond. By "pits" I presume are meant such coal workings as are carried on by means of open air or shallow surface operations, or by means of adits driven from the contiguous ground.

THE LARGEST VENTILATOR IN THE WORLD.

The *Monitary and Mining Gazette* says the largest mine ventilator in the world is a guibal fan 45 feet in diameter, and 12 feet face at the Usworth Colliery near Newcastle-on-Tyne. That journal says: This fan runs about forty-five revolutions per minute, and is said to circulate 200,000 to 250,000 cubic feet of air per minute. It is driven by two first motion engines, 36 inch diameter cylinders, 3 feet stroke. The upcast shaft is 10 feet diameter, and 600 feet deep. The workings in three seams are ventilated through it. The output of the Usworth Colliery is about 1500 tons per day. The mines are very extensive. All the underground haulage is performed by machinery; two of the three seams are worked on the bord and pillar system; the other is worked on the long wall plan.

THE SCOTCH PIG IRON TRADE.

As I last wrote the warrant market at Glasgow was quiet, but as soon as the week's business was fairly afloat a firmer tone became manifest, and a moderate number of good transactions were quickly effected at figures which were shaded a little to meet particular cases. By Wednesday afternoon, nevertheless, the inquiry had considerably diminished, and there was so little animation that warrants came down a couple of shillings, despite the fact that the shipping returns for the week ending on the Monday were a trifle heavier than for the corresponding period of last year. The reaction was but temporary, and on the following day (Thursday) the market hardened under the encouraging influence of a strong demand, which was so well sustained that by Friday afternoon current warrant figures had reached 85/, and maker's brands, particularly Coltness and Eglinton, were some shillings dearer. Warrants are this morning (Monday) quoted at 85/ by sellers, with buyers holding out for sixpence to threepence per ton less. I may just state that the affairs of the Blochairn Iron Company, one of the largest of their kind in Scotland, have gone into liquidation. The works are for sale.

Writing on September 18 (evening), Messrs. James Watson & Co., Glasgow, report: "Our Scotch pig iron market opened this week firm at 84/, cash, for warrants, but subsequently the price dropped to 81/; a strong demand, however, set in yesterday and to-day, under the influence of which price advanced to 85/, at which we close sellers, buyers 84/9."

Shipments last week were 11,497 tons against 11,477 tons in the corresponding week of 1873. We quote:

	No. 1.	No. 3.
G. M. B., at Glasgow	91/	79/6
Gartsherrie, "	111/	86/
Coltness, "	112/6	86/
Summerlee, "	101/	84/
Langloan, "	111/	86/
Carnbroe, "	94/6	83/
Calder, at Port Dundas	111/	86/
Glengarnock, at Ardrossan	99/6	84/
Eglinton, "	91/	79/
Dalmellington, "	91/	79/
Shotts, at Leith	105/	86/
Kinneil, at Bo'ness	92/6	82/6

Messrs. Wm. Colvin & Co., Glasgow, report under date of September 22: "The Warrant Market, which closed this day last week at 82/, steadily improved during the latter part of the week, and closed strong on Friday at 85/. On Monday there was some eagerness shown to buy, and the price was run up from 85/ to 86/3, closing with buyers at 86/. To-day the market opened firm, and as high as 86/4½, cash, was paid. The tone afterward became easier, and at the close there were sellers at 84/9. The demand for makers' iron, especially from the Continent, has been very good, and this, more than any other feature, has given strength to the market. The undernoted prices show a decided advance on those of last week."

	Deliverable alongside. No. 1.	No. 3.
G. M. B., at Glasgow	92/	80/
Gartsherrie, "	112/6	86/
Coltness, "	112/6	86/
Summerlee, "	102/6	84/
Carnbroe, "	96/	84/
Monkland, "	94/	80/
Clyde, "	94/	80/
Govan, at Broomielaw	92/	80/
Langloan, at Port Dundas	111/	85/
Calder, "	112/6	85/
Glengarnock, at Ardrossan	100/	84/6
Eglinton, "	92/	80/
Dalmellington, "	92/	80/
Carron, at Grangemouth, selected	105/	....
Shotts, at Leith	107/6	86/
Kinneil, at Bo'ness	92/6	80/
Bar Iron	£10	
Nail Rods	10	

SHIPMENTS.

Week ending Sept. 19, 1874	Tons, 14,226
" Sept. 20, 1873	" 8,364
Increase	" 5,862
Total decrease since Dec. 25, 1873	" 145,640

THE ORDNANCE OF EUROPE.

The London *Standard* has lately been publishing a long series of exhaustive extracts from a work recently issued by Captain Simpson, of the American Bureau of Ordnance. The descriptions are very interesting, and prove the Captain to be a man of keen observation, but it is not to be expected that his remarks and comparisons should be in all cases palatable to British readers. I am not, therefore, surprised to find *Iron* fall foul of the author (in its issue of September 19th), selecting as its text the Aboukoffsky Steel Works (Russia), but collaterally bringing in Herr Krupp as a co-victim with the gallant Captain. *Iron* turns up its ferruginous nose, metaphorically speaking, and pooh poohs the figures quoted as to the admirable tensile strength of both the Krupp and Aboukoffsky steel, alleging that it cannot be compared with that in use at the Royal Arsenal, Woolwich, or, indeed, with the average productions of our steel manufacturers! *Iron* evidently believes "there is nothing like leather."

THE TRADES OF SHEFFIELD.

There is not much change to record this week

in trade affairs generally, but it is tolerably clear that matters are on a better and sounder footing than at any time during the last six months or so. The rail mills appear to be benefiting most directly by the ameliorated state of things, the output from them having been considerably augmented during the last few weeks. Quotations are still on the basis of a very narrow margin of profit, but it is believed that the placing of the numerous specifications now in the market will shortly have the effect of sending prices up a little.

I hear that several local firms are creditors to the estate of Messrs. Tiden & Nordenfeldt, London, whose liabilities are stated at over £540,000. They were engaged pretty largely in the Russian and Swedish trade, chiefly in rails.

Foreign iron has an upward tendency. On Tuesday two lots of Russian K.B. bar iron were put up by auction here and were closely competed for. One lot of 1262 bars of rolled, weighing 41 tons, sold at £18 per ton, and another lot of 1743 bars of hammered, weighing 53 tons, was disposed of at £19. 5/ to £19. 10/ per ton.

Hematite ores preserve their full value, but may possibly decline shortly, seeing that shipments are being made from Bilboa, whither Sir John Brown, Mr. Mark Firth, and other gentlemen interested in the ore mines, went on Friday last. British hematites are worth 25/ to 29/ per ton, but are likely to drop shortly.

There is a moderately well sustained but not really brisk demand for West Coast hematite and Bessemer pig iron for the use of the Bessemer converters in this district at the following prices: Maryport hematite at the works, No. 1, 2 and 3, 95/; No. 4, 90/; No. 5, mottled and white, 90/; Bessemer, No. 1, £5; No. 2, £4. 17/6; and No. 3, £4. 15/ per ton; to which must be added carriage into this locality. Millom Bessemer is: No. 1, 95/; No. 2, 92/6; and No. 3, 90/. Ordinary No. 3, 90/; No. 4, 87/6; No. 5, 87/6; M and W, 105/ per ton on the usual four months' terms.

Following in the wake of those colliery proprietors who advance their quotations 1/ to 2/ per ton on the 1st instant, several other coal-owners notified a rise of 1/ per ton on Friday and Saturday last. This rise chiefly affects hard coal, for which there is a steadily good export demand in addition to the extensive purchases which have been and are being made for the London market. Soft coal is firm, but has not yet, I believe, been quoted at higher figures, nor have other descriptions been generally advanced. Gas coal is 12/ to 13/, and good house qualities 12/ to 16/ per ton at the pits.

The cast steel trade is still exceedingly quiet, there being literally no business of any moment doing. Some of the largest works are allowing the melters to make steel in advance, but orders do not come in of any bulk, so that a further reduction of working time would appear to be inevitable, unless the demand should improve.

The coal traffic to London during August was much smaller than during the corresponding month of 1873. The Great Northern this time ranked fourth only with 56,219 tons, the Great Western being third with 61,139 tons, the London and North Western having the second position with 76,789, and the Midland taking premier honors with 120,754 tons.

There was a falling off over the Great Northern in Silkstone and Barnsley coal, and the Midland conveyed much less from Stavely, Eckington, Sheepbridge and other Derbyshire pits.

In the file trade there is much irregularity, some firms being quite busy, while others are barely able to keep going. In cutlery there is a little better inquiry on home account, and a somewhat improved business with Northern Europe and the larger colonies, but I do not hear of any clearly augmented call for common cutlery for America. I believe Rogers' carvers and table cutlery sells a little more freely, and G. Wostenholme's pocket knives are moving off with increased freedom. Otherwise there is little change to report in any branch of the cutlery industries here.

AN ENGLISH "GRAND TRUNK" PROPOSITION.

The *Railway News*, which is generally supposed to be pretty well aware what it is about in these matters, suggests that the already exceedingly powerful Midland Railway Company should purchase the unfortunate London, Chatham and Dover Railway line, so as to make the system the "backbone of England." The *News* thinks that to make one company from Carlisle in the North to Dover in the South, with several metropolitan stations, would be a scheme well worthy of the enterprise of the Midland Company, and one eminently sure to be of a profitable character. My own idea is that it would be a far more feasible idea to construct a great through line from Birmingham to Southampton and Plymouth, so that the immense Manchester, and other cotton and shipping traffic for India, &c., could be sent direct instead of being sent round by London, thus increasing the distance by 150 miles or so.

BIRMINGHAM IS VIRTUOUSLY INDIGNANT,

The cause of her virtuous indignation being an article which lately appeared in the British *Trade Journal* on the electro-plate trade of Sheffield and Birmingham. In this article Birmingham is alleged to have been unjustly depreciated: and to have been unfairly deprived of the honor of having invented silver plating. The Birmingham *Post* thus vents itself in vindicating Birmingham.

'Birmingham has a name,' says the paper, 'almost equivalent to 'shoddy' in the woolen districts; and, without the slightest offence to the good firms there, we believe that the majority of customers would any day prefer a piece of Sheffield plate to that known as Brummagem.' Leaving to this paper the consideration of the question of taste in publishing this statement, we may state that the facts are simply incorrect. The process of plating through the instrumentality of electricity is well known to be of Birmingham origin, and was patented by Elkington, who further granted for the term of his patent licenses to other manufacturers who desired to avail themselves of this invention. A glance at the show rooms of any of our leading manufacturers of electro-plate would at once dispel all suggestions of 'shoddy,' or even the yet more threadbare term of 'Brummagem.' Doubtless, many makers find it to their interest to make flimsy articles to meet the requirements of a cheap market, but the same holds good of all trades in all towns. It should be further borne in mind that it is not at all an uncommon thing in the electro-plate trade here to make goods and to plate for Sheffield houses. We are pleased to note that a local firm, on remonstrating with the paper in question, received in reply a published apology for the gratuitous slur which had been cast upon one of the leading industries of this town."

What a virtuous people we are!—thank goodness!

TRADES OF BIRMINGHAM AND STAFFORDSHIRE.

I confess that I approach this review with feelings somewhat approaching to temerity, when I find, week after week, that I am compelled to iterate and reiterate "with iteration"—that there is still "no change." I begin to despair. I feel that there ought to be some kind of alteration, but on looking around I don't see where it is to proceed from; indeed, I despair of there being any ultimate change at all. Still a still small voice—very still and amazingly small in this instance—whispers that the end of the quarter may bring a reduction of 30/ to 40/ in the price of iron, and then there will be matter enough whereon to hang discourses and whereat to pepper away arguments and theories like small shot from a blunderbuss. But even adopting this view, I don't feel much better able to spin a yarn, for I find that the whole Staffordshire and Birmingham iron trade is quiet, and that orders, if such things exist, are being held over in anticipation of the drop. There are, in strict point of fact, more inquiries in the market for finished iron, and should a reduction take place commissions of some real value will doubtless be placed. Marked bars are still nominally £12, but makers are discounting that figure for future orders. Common unmarked bars remain steady at £10 to £11; sheets, singles, £13 to £14; hoops, £12 to £13; hot blast native all mine pig, £2. 10/ to £5. 15/, and cinder pig, £3. 5/. The hardware industries are unchanged since last written upon in these columns. The Birmingham *Post* thus tabulates a statement of shipments to the United States during the year:

Principal Articles.	Eight months ended August 31, 1873.	1874.	Increase or Decrease p. ct. compared with 1873.
	Cwts.	Cwts.	
Copper, unwrought.	44,464	724	98·4†
Copper, wrought....	1,425	717	49·7†
Hardware and cutlery, value.....	£548,925	£427,947	22·1†
	Tons.	Tons.	
Iron, pig.....	78,403	31,008	60·5†
Iron, bar, bolt and rod.....	21,574	2,629	87·9†
Iron, railroad.....	141,330	78,531	44·4†
Iron, hoops, sheets and plates.....	14,296	3,601	74·8†
Iron, tin plates.....	64,353	60,227	6·4†
Iron, cast or wrought	11,806	16,458	39·4*
Steel, unwrought...	13,966	8,651	38·0†
Lead, pig and sheet, &c.....	2,334	1,808	22·2†
Machinery, other than steam, value	£373,848	£136,770	63·4†

The asterick (*) denotes increase, and the dagger (†) decrease.

SOUTH WALES

does not afford me much substantial food for comment this week, so far as the iron and steel industries are concerned. I am able, however, to state that several of the chief iron works are much busier on foreign specifications than they have been for many months past. Tredegar, Abernant and Dowlais are almost fully employed, but Cyrfarthfa has not yet cast off her garment of sloth. At Dowlais fresh pit sinkings are being made to the 4 feet seam of coal near Bedlinog. Many other new collieries are being opened up in various parts of the southern valleys of the principality—a fact which has led to a brisker inquiry for contractors' rails for colliery sidings. No sooner has one section of the Welsh workmen been conciliated or conquered than another becomes "obstreperous," and needs disposing of. In the latest difficulty, the engine men decline to submit to a reduction in wages, modestly proposing—as a countermove—that their wages be fixed at £9 per month, with a due allowance of house coal. This demand was declined by the coal owners, and a strike is consequently probable.

THE METAL MARKETS.

The metal market has improved since my last report, a good many sales of copper having been effected, and tin has hardened. Lead is rather scarcer, and more difficult to buy at a full rise of 5/ per ton. At the Cornish ticketing at Truro on Thursday last, 3532 tons of copper ore realized £15,852. 15/; average standard, £105; being a decline of £2·2/ upon the last sales. The *Mining Journal* (Sept. 19th) reports:

Copper.—There is a further diminution of 200 tons in the stock of Chili produce in Swansea and Liverpool. A healthy tone has pervaded the market, and prices have somewhat strengthened. During the week about 3000 tons of Chili bars are said to have been sold, the price depending upon the brands and prompts. In g.o.b. the price has ruled from £78. 10/ to £78. 15/, both for cash and arrival, until to-day, when £79. 10/ was given. Special and picked brands have realized from £78. 15/ to £80, one sale of 800 tons being reported to-day at the latter figure for arrival. Two or three sales of regulus have been made at 15/9 per unit. Burra Burra has changed hands in small quantities at £87 to £87. 10/. Wallaroo quoted at £89. In English, tough and best selected, there is a good consumptive demand, and prices have remained firm, the former £86 and the latter £88. Manufactured has not been so much inquired for, and sales of yellow metal have also been limited. *Lead.*—There has been a very strong market for this metal, and a further rise has been established. The improvement is owing, perhaps, more to the want of supplies than from any excessive demand. There is no speculation going on at present, but the advance may be taken as purely from legitimate causes. Such being the case, there is every prospect that the rise will not prove of an evanescent nature, but hold for some time. Some sellers decline making a price for any large quantity for the present, as they cannot undertake to make any fixed deliveries. Spanish continues scarce, £21. 12/6 to £21. 15/ being the present value. *Spelter.*—Sellers are very firm, and now ask £22. 12/6 to £22. 15/ for ordinary Silesian, being a rise of 5/ per ton. Vieille Montagne zinc has advanced £2 per ton. *Tin.*—An advance has been made in English of £2 per ton. Foreign has also participated to some extent in the improvement, and sales are reported of about 300 tons; a small lot of Banca at £101; Billiton, at £94, Dutch warrants; Straits, for arrival, at £92 up to £92. 15/ and £93. 10/, £94 for cash; Australian, for spot and arrival, between £91 and £92 has been realized. The feeling to day is not quite so good, and as there has been less disposition to buy, prices have been easy. *Tin Plates.*—Orders are still for limited quantities, but prices have not undergone any alteration. *Quicksilver.*—The price remains the same as last week—£23 per bottle.

Messrs French & Smith (London Sept. 18) thus write: "There is an improved demand for Metals, and values have increased during the past week. Iron is in fair demand. *Copper.*—Considerable parcels of Chili bars have changed hands at £78. 10/ to £79, for g. o. b. Australian is difficult to buy at current quotations. *Tin.*—The English smelters have advanced the rates £2 per ton. Foreign is in fair demand. Banca, £101 per ton; Billiton, £95; Straits, fine, £94; ditto afloat or forward, £92. 10/ to £93; Australian ingot, £91. 10/; English, refined, £96 to £100; ditto common bars in barrels, £98 to £99; ditto blocks and ingots, £27 to £98 per ton. *Tin Plates.*—Charcoal I. C., 36/ to 41/ per box; Coke I. C. 27/ to 35/ per box. Lead difficult to buy at an advance of 5/.

Messrs Pitcairn, Campbell & Co's. fortnightly Liverpool metal report runs in this wise: "*Copper.*—With a good consumptive and export demand the copper market has continued healthy and active, and we advance our quotations 20/ per ton for Chili bars. Quotations are: £78 10/ to £81 for bars; 15/3 for ores; 15/9 for regulus; 16/6 to 17/, nominally, for Corro Corro barilla. Business transacted during the fortnight comprises 3000 tons bars at £77 to £80 per ton, according to brand and prompt; 268 tons regulus here at 15/6; 460 tons at Swansea at 15/9; and 600 tons to arrive there at 15/9 per unit. At the Swansea sale on the 1st inst., 1605 tons ore, average produce 19 3-16ths per cent., realized 15/1¼ per unit. Stocks of copper (Chilian and Bolivian), in first and second hands, likely to be available, we estimate at: Liverpool ores, 1100 tons; regulus, 668 tons; bars, 12,300 tons; ingots, 20 tons. Swansea ores, 2900 tons; regulus, 6303 tons; bars, 865 tons; representing about 17,100 tons fine copper, against 17,300 tons 31st ultimo; 21,400 tons 15th Sept., 1873; 20,800 tons 15th Sept., 1872; and 17,200 tons 15th Sept., 1871."

LATER.—*London Metal Market*, Sept. 23d.—*Copper* steady, 100 tons Chili being done at £79. 10/, cash, and Wallaroo held at £89. 10/. *Tin* is rather flat, Straits being quoted £92. 10/, and Australian, £90, cash. For *Spelter* more money is asked, common being held at £22. 15/, and specials, £23. 5/. *Lead* is scarce and a shade dearer. Other metals unchanged. Best *Bowling Iron* is to-day declared down 40/ per ton all round, and at Sheffield merchant bars and hoops are respectively 10/ and 20/ per ton lower.

The Hydro-Thermic Motor.

We have recently had the opportunity of inspecting a new form of engine invented by Signor Ferdinand Tommasi, and which has only been brought before the notice of the public during the last few weeks. The name of the apparatus is the hydro-thermic motor, or oil engine. The first machine which we examined is not an engine, but only intended to illustrate the principles upon which the actual engines are constructed, or, rather, to demonstrate the power developed by oil or glycerine through expansion, when heated to a moderate extent. An iron tube about one-third of an inch in diameter and 3 ft. long is filled with oil and fixed vertically. A plate of lead ¼ in. thick is fixed on the top of the tube by means of a screw cap having an opening in it of the same diameter as the interior of the tube. Gas jets are then lighted along the whole length of the tube, and almost instantaneously a disc of lead is forced out by the expansion of the oil. The plate has the appearance of having been punched, and the forcing out of the disc is not accompanied by any explosion. The inventor claims that this experiment demonstrates that very little heat will suffice to produce great power if employed to expand a liquid, instead of transferring it into steam; that if we employ a liquid, such as oil or glycerine, which cannot be transformed into steam, all danger of explosion is avoided, and that as oil or glycerine develop their power within a small space, all machines intended for heavy work can be made to work by themselves, instead of being set in motion by a separate engine, as in the case when we employ a steam engine. It is stated that the power exerted in this experiment is equal to 700 lbs. on the disc cut out, or 10,000 lbs. per square inch, which is about the pressure required to punch lead of the thickness used. The oil is stated to be raised in temperature to the extent of 7° Cent., or 12½° Fah. The second machine is also a model for the purpose of demonstrating that the oil can be regularly and alternately expanded and contracted in the same vessel, so as to produce the reciprocal motion necessary for working engines. A small receiver containing oil is fitted with a vertical glass tube. In the receiver are placed small copper tubes, through which boiling or cold water can be sent at pleasure on turning a cock. On the admission of the hot water, the oil expands very rapidly and rises in the glass tube; on substituting cold for hot water, the oil contracts and descends. In practice, the hot water would be returned to the boiler after passing through the oil chamber, and no heat would be lost except as much as had been transformed into work. The practicable application of the invention is shown by three working models of a press, a punching machine, and a riveting machine. The action of the first of these will be readily understood: The oil in the receiver being heated by means of pipes containing steam or hot water, expands, and drives before it a piston, which carries the platform of the press. To lower the platform, cold water is admitted, the oil contracts, and we see little mechanical difficulty in accelerating the speed to the required extent. We were informed that another engine, self-acting and of quick motion, is now being constructed on the oil expansion principle; it is intended to demonstrate the application of this system as a means of propulsion on tramways. As to the relative economy of the oil engine and the steam engine, we cannot at present express any opinion in the absence of any reliable data on which to base our calculations; but if experience should prove that the same power can be obtained from the two descriptions of engine with the same combustion of fuel, we consider there is a wide field open for the introduction of the oil engine, not only on account of dispensing with various classes of machinery which are requisite when a steam engine is employed, but also on account of the absence of risk from explosion, total freedom from the noise of escaping steam, and the advantage of being able to use a hot water boiler instead of a steam boiler. For presses, lifts, punching and riveting machines, it appears to be a fairly promising invention, while if a compact, quick motion engine can be constructed on this system, its adoption for driving tramway cars will not be long deferred.—*The Engineer.*

Scientific Industry.

We take the following from an interesting article in *Engineering*, which merits attention:

We think it is scarcely understood by many a mechanic and many a workman engaged in our various manufactories, that they may exhibit at such a show as that under consideration, appliances of their own invention, either alone or in combination with other arrangements of machinery, so that they may receive the examination and criticism of the visitors, and call proper attention either to the inherent value, or to the worthlessness of the idea that may be exhibited under full protection of the Act, so that should a good opinion be formed by those competent to judge, further steps may be taken, under letters patent, for the development of the invention. And not less important is the consideration that good notions are likely to draw the attention of those who may render the workingman inventor the aid of capital or means of introduction which perhaps might otherwise be long sought for in vain.

We believe that in every kind of manufacture there are numerous "little dodges" (if we may use the term without a derogatory interpretation being put upon it) that are exceedingly valuable, and their extended influence might widely benefit the nation and the world. How often it has been shown that a great result has arisen from some apparently trifling suggestion emanating from the brain of some thoughtful workingman, to whom little or no benefit has ever come as the result of his cleverness. If this country is to keep its position in the mechanical race with the world, it cannot afford to let any light be hid en from view. All must be brought forward and receive their full and due reward in actual use, for the benefit not only of the public, but of the inventor also.

It is strange that it takes so much to persuade workingmen that any machine that can do his work as well or better than he can is a direct advantage to him, and we scarcely hope to be able to touch the "philosopher's stone" of wisdom so ably as to persuade those yet unconverted, to look on the matter with our eyes. Still we would call the attention of workmen to the fact, that every improvement in mecanical appliances has ultimately benefited the nation, and in so doing each individual has had a share, and we wish to remind them, that the individual workmen of our country, may each and every one of them have the opportunity of adding not only to the nation's knowledge and wealth, but to their own prosperity.

Nearly all of the charcoal furnaces of the Salisbury region (comprising the western portion of Litchfield county, Conn., and eastern portion of Duchess county, N. Y.) have been idle the past season, and the prospect is still very unfavorable for them. But the furnace of N. Gridley & Son, at Wassaic, Duchess county, is still running, and is turning out about 70 tons per week of a very fine quality of iron for car wheels, malleable castings, rolls, or any castings where great strength is required. The ore used is hematite from Amenia, the mine being owned by the same firm, and from it they make seven grades of iron, from very soft to white. The furnace was built in 1826, is 32 feet high and 9 foot bosh. For many years the entire product was sold to the cannon foundries, but is used now principally for car wheels and malleable.

Bessemer Plant.*

BY MR. B. WALKER, LEEDS.

The following is an abstract of a paper read at the Barrow meeting of the Iron and Steel Institute by Mr. B. Walker. Owing to the crowded state of our columns we omit the drawings, which we are unable to accommodate:

I have the honor to submit drawings and descriptions of some of the most important appliances used in the manufacture of Bessemer steel. This process is now recognized to be of such vast importance, not only to this country, but to all other civilized countries, that I think you will readily admit the advantage to the members of the Institute of having before them drawings of some of the latest machines now made. In the opening address of the president, at London, he told the members that the coal panic, which disturbed the whole trade of the country, would have been avoided if 5 per cent. more coal had been obtained, or 5 per cent. less required. I believe this observation is founded on sound commercial principles. Apply it to the manufacturing of puddled iron, and then imagine what would have been the condition of the iron trade had it not been for the invention of Mr. Bessemer.

Mr. Williams told the meeting, at Dudley, that he was steeped to the lips in anxiety about puddling; had it not been for the material that has been made by the Bessemer process, by this time he would have been overwhelmed.

It is not my intention to institute any comparison between the steel made by the Bessemer process and the well known Siemens steel, nor is it my intention to compare it with what is called crucible steel, as made by Messrs. Firth, Vickers, Cammell and others; nor is it, further, my intention to compare the machinery to be described in this paper with machinery made by others; but I shall confine myself to a description, pure and simple, of the machines lately made by my firm, for some of the most eminent producers of Bessemer steel.

A drawing exhibited shows a pair of high pressure, horizontal engines, suitable for blowing the cupola, steam cylinder, 12 in. diameter, stroke, 30 in.; air do., 36 in. diameter and 30 in. stroke. The air cylinders are fitted with piston valves, and are further provided with leather relief valves to prevent either vacuum or undue pressure. Also, to absorb the air contained in the clearance between piston body and cylinder cover. This combination of piston and relief valves obviates the spitting which takes place in engines having metallic piston valves alone in the air cylinder, also allows engines being run at a very high speed, which can be varied to suit the work required to be done. Indeed, the speed of engines can be varied to suit the pressure in the air receiver; so that, supposing some of the tuyeres to be shut off, the engines would retard themselves, starting again at full speed on reopening tuyeres.

General Plan of Cupola for Melting the Iron ready for the Converter.—The shell of this cupola is about 7 ft. 6 in diameter, lined with firebrick or ganister stone to the section shown in the drawing. There are eigh tuyeres, four above in one line, and four below in one line, also, and at the distance indicated on the drawing. The air trunk or box forms part of the outside shell, being riveted to it, and the tuyere pipes descends from this air box. Four tuyere pipes are each fitted with independent shut-off valve, so that the quantity of air can be regulated at each pipe. The discharging hole is at the side; it may sometimes be placed, and with equal advantage, at the bottom, a door with hinges on movable plate being released and the slag, &c., allowed to drop.

The spiegel iron is melted in a smaller cupola, the general design being like the cupola above referred to. I may mention that, at the London meeting, Mr. J. A. Jones, in describing his puddling apparatus, drew attention to a cupola invented by Mr. Thomas, and gave it as his opinion that this cupola was well adapted for melting the iron previous to putting it into the puddling furnace. I have seen this cupola at work several times, and I am of opinion that it could be very profitably employed in melting the iron for the converter.

Blowing Engines for Supplying the Converter with Blast.—The steam cylinders, high and low pressure, are respectively 36 in. and 60 in diameter, and 5 ft. stroke; the blowing cylinders 48 in. and 5 ft. stroke. There are two piston rods in the steam cylinder; this arrangement lessens the total hight of the engine, and has long been in use in marine engines. These piston rods are secured to the crosshead, which is of wrought iron, by nuts, and the air piston rods are cottered. The connecting rods are not short, and so great angular strain on the slide bars is avoided. They are forked at one end, being provided with straps, jibs and cotters at both ends. The cranks are of wrought iron, forged with pins on them. On the crankshaft there is a fly-wheel, of about 20 tons weight. The low pressure cylinder is steam jacketed.

The valves are of the piston class, having an elastic packing. The valves in the air cylinder are also pistons. The steam valves are set so as to expand the steam twelve times. The points to which I wish to draw your special attention are: the arrangement of the air cylinder piston valves with the delivery valves. These delivery valves only open when the pressure is greater in the air cylinder than in the air receiver; there is very little space or clearance between these valves and the piston when at the end of the stroke, so that there is the least possible waste of power. The valves in the air cylinder being metallic can be greased with self-acting lubricators, like the steam cylinder valves. Considering that they are vertical engines, the stroke is extra long. The steam and air cylinders are easily got at, and the whole machine is self-contained. The piston valves are only used for admitting air into the cylinder. The pressure of blast is 25 lb. per square inch, that of the steam being 75 lb. above the atmosphere. In some of the Bessemer blowing engines, made by my firm, the air cylinders have had water jackets with metallic valves; these jackets are found to be unnecessary. The engines are condensing, but there is a valve arrangement for working them high pressure. The air pump and condenser are worked by a small separate engine. This I consider a good plan, as it prevents the possibility of the large engines being broken down by any part of the condensing apparatus getting out of order. This small engine can be speeded to suit the work to be done, and started, and a vacuum formed before turning the steam on to the large engines. This enables the large engines to start very readily, and use less steam than as non-condensing engines.

The engine for condensing is a horizontal one, diameter of cylinder 12 in., stroke 18 in., the air pump being double acting, having 18 in. diameter, and 18 in. stroke. The injection is extra large; its opening is regulated by the arrangement of hand-wheel and spindle going through the hot well. A flat valve is placed before the injection orifice, and the amount of opening regulated by the hand-wheel.

The advantage of compound engines over single ones is still a point of dispute with a great number of engineers. I am of opinion that the single cylinder engine may often be used with advantage. For example, in the case of a large beam engine for driving a factory, where long stroke and heavy fly-wheel can be had, it may be very advisable to employ the single cylinder with a high rate of expansion, but in the case of a pair of engines used for compressing air to 25 lb. and upward, I think the advantage of the compound system is very considerable. The experience of the last ten years in marine engines has clearly shown that the economy in using high and low pressure steam engines is very great. Some of the best makers of engines employ the compound cylinder engine in rotary pumping engines, and I am sure that if it be advisable to use them in marine and heavy pump work, it is still more so in blowing engines, working with high pressure of blast. Some people seem to think that there is additional complication in compound engines; this I believe to be a mistake.

At the beginning of the stroke in the air cylinder there is very little pressure, nor is the pressure full on until the piston has passed half-stroke, while, on the contrary, in the steam cylinder the pressure is greatest at the commencement of the stroke and least at the end; the steam is expanded while the air is compressed. When the greatest force is required for the air, the force in the steam cylinder is least, owing to expansion. In the pumping engine the force is uniform from the beginning to end of stroke, as also in a factory engine.

When the engines are worked compound, the power in both cylinders, at the beginning and end of stroke, is more uniform, and, therefore, more economical and better adapted for air compressing. If two high pressure cylinders be used, both pistons have to be made tight fitting to stand the high pressure steam, and the friction caused by the piston being so tight is continued throughout the stroke in both cylinders, while with compound engines the friction in the low pressure cylinder is considerably reduced, as its piston has a much lower

* Paper read before the Iron and Steel Institute at Barrow.

pressure to stand against. The valves also will waste far more steam when all are exposed to high pressure.

My firm has just completed two pairs of large engines for blast furnaces, one pair to work at 4 lb. to 5 lb. per square inch air pressure, the other 8 lb. to 10 lb. per square inch. Both engines are to be worked where coals are very expensive, and after most anxious consideration it was determined to adopt the compound system of working. If there be any advantage in employing compound engines for 4 lb. to 5 lb. pressure of blast, there must be still a greater benefit in using compound cylinder engines for compressing to 25 lb. per square inch. In both pairs of blast furnace engines we placed the cranks immediately opposite, while in the Bessemer engines the cranks are at right angles; the object of this being to insure more uniform blast pressure and greater facility in starting.

It is not my intention to trouble this meeting with consideration of this question in reference to indicator diagrams, as the matter is so technical, and from my experience in connection with the working of engines, the indicator card is very liable to mislead; the power may be shown on the card but the useful effect does not correspond. I do not for one moment say the indicator should not be used, for I consider it one of the most useful instruments, in the hands of a skillful man, for finding out the defects of an engine, especially as regards the setting of the valves.

Those who wish to pursue the subject of single and compound engines still further, I would refer to a very important paper given before the meeting of the Mechanical Engineers, in 1872, by the president, Mr. Bramwell, of London. The subject is there treated most ably and exhaustively, and several gentlemen having experience in this matter took part in the discussion that followed, and gave some of the results of their own practical experience. Mr. Bramwell said that "these engines (meaning compound) come in as a most valuable and efficient aid in carrying out the principle of high pressure and high expansion, as, by their means, the area exposed to high pressure is limited to a moderate sized piston, and only a moderate cut-off at one-half or one-third stroke is required, such a cut-off as can be well done by an ordinary slide valve with separate cut-off slide; whilst the second cylinder enables the expansion to be carried to a very high degree without involving any practical objections. He mentions a pair of marine engines. The original engines had two 54 in. cylinders, and the compound engine had 42 in. and 75 in. cylinders: they were both vertical direct-acting engines, working cranks at right angles, and both having surface condensers; but the original boilers were worked at 20 lbs. pressure, and were replaced by boilers working at 60 lbs. pressure. The vessel was not altered, and continued working under the same conditions, but at a somewhat greater rate of speed, and the consumption of coal, which averaged previously 38 tons per 24 hours, and 4·34 lbs. per indicated horse-power per hour, is stated to have been reduced by the alterations of the engines to 24½ tons per 24 hours, and 2·80 lbs. per indicated horse-power per hour."

Drawings exhibited show the converters like we have made them. The larger one to be used chiefly in the manufacture of steel rails, the smaller one for tires, straight axles, and other special work, where quality will be a very important element. There is a difference in shape, chiefly in the mouth and lower part of the converter. In the larger one the tuyere pipes or bottom is intended to be removed, being fitted with what is technically called "dry bottom." This plan was introduced by Messrs. John Brown & Co., of Sheffield, and is now used by most other makers in that district. The converters are both tipped by cylinders, which are placed horizontally, a spur wheel is keyed on the trunnion, and this works into a steel rack fastened to the cylinder. The water pressure is admitted through a slide valve placed in a convenient position. The facility with which the converter can be handled has been very much admired by mechanical men. The smaller converter is not intended to have a "dry bottom." The trunnions in the large converter are of cast steel, the belt being wrought iron; in the small one the trunnions are of cast iron, also the belt trunnion and belt being in one.

The Ingot Crane.—This form of crane is very extensively used for lifting the ingots out of the pit. It is rather wasteful in the amount of water it uses, its general simplicity and rapidity of action being its chief recommendations. The ram is well guided by a top and bottom gland. On the top of the ram there is a crosshead carrying the jib, which is strongly stayed; on this jib there is a monkey, which is moved to and fro on four runners by means of a pitch chain. In the crosshead casting are inserted a number of friction rollers, so that the jib turns very easily round the ram. These cranes are sometimes worked by a valve attached to the crane itself, at others by a valve in the pulpit or distributing box.

The Center Lift.—This is placed between the two converters and turns round on its own center. It is raised and lowered by means of hydraulic power like the ingot cranes, the turning round being done by means of gearing, placed under ready command of the workman, who stands on the crane itself. The ladle is fitted with the usual appliances for tipping the metal into the molds. The whole thing is made very strong, and can be very easily worked.

The Cupola Hoist.—This hoist is used for taking the pig iron up to the cupola stage. It consists of a simple ram and cylinder, the ram being about 12 in. diameter; the one shown has a 22 ft. lift, and will raise a weight of about five tons of metal. The cage is made of wrought iron, and is attached to the ram by bolts, being guided by four uprights of wrought iron, also.

The accumulator has a ram 24 in. diameter and a stroke of 19 ft. The cast iron crosshead is bored out and the ram end slips into it; the casing for carrying the ballast is of wrought steel plates and angle iron, being about 10 ft. diameter and 18 ft. long, secured to the crosshead by a number of large bolts. The casing is strengthened by a number of gusset stays which go the whole length. The cylinder is bored out at the gland end and fitted with a gun metal bush. The cup or cast iron formation in which the cylinder stands is bored out, also, and the cylinder is turned to fit it. This cup, as it is called, is bolted on a stone foundation. Cast iron guide brackets are fastened to the wrought iron casing, and vertical timbers with rails attached to them form a guide for the casing.

A drawing exhibited shows the hydraulic pumping engines for supplying the accumulator. There is nothing very extraordinary in them. They consist of a pair of horizontal high pressure engines, with double acting force pumps, the cylinders being 14 in. diameter, and 2 ft. 6 in. stroke. The fly-wheel is common to both. Cranks are, of course, at right angles. The pump barrels are lined with brass, and the valves are of gun metal. The whole is a very simple arrangement, and does not get out of repair. I have shown no plan of the general arrangement for disposition of the machinery used in the Bessemer process, nor yet of the building, as this depends so much on the work to be done and upon local circumstances.

Most of the machines described have been first designed by Mr. Bessemer. I do not say that they are exactly as they left his hands, because experience, increased mechanical knowledge, and the use of the apparatus, has naturally suggested various improvements. Mr. Bessemer's invention is second to none, and the good he has done by it, not only to the iron trade, but to all other trades, cannot be overestimated. It is well known that many eminent men in this and other countries have assisted Mr. Bessemer in perfecting his process; at the same time he has always taken the lead, and I am sure he would be the very last man to disparage the efforts of those who may have assisted him. On the contrary, I am certain he would always be willing to give credit to those who have done a little as well as to those who have done much. I dare not attempt to give a list of these men, however, remembering where we are assembled. I cannot forbear mentioning the name of one gentleman, Mr. Smith, manager of the Barrow Steel Works. This gentleman has always been in the front, and has done much in improving the machinery required for making steel rails. He has always been willing to adopt new contrivances, new furnaces, or anything else which he thought likely to improve the manufacture of steel and benefit his company.

Blake's stone crusher, well and favorably known to most of our readers as a machine of superior excellence, has received the first premium in its class at the Cincinnati Exhibition.

A Detroit boy got a brass kettle fastened over his head, the other day, and it was found impossible to get it off. It is strange they didn't think to carry him to a brass foundry and have it melted off. Or they might have dissolved it off by laying the boy to soak in a tank of dilute sulphuric acid. It is curious how thoughtless some people are in moments of emergency.

Furnaces 5 and 6, belonging to the Crane Iron Company, Catasauqua, Pa., last week produced 540 tons of all strictly No. 1 foundry pig iron. This, for furnaces of their size, 18 feet boshes, is remarkably good work.

London Metal Market.

(From The Mining Journal.)

	£.	s.	d.	£.	s.	d.
Copper—₱ ton.						
Best Selected	87	0	0	88	0	0
Tough Cake & Tile	85	0	0	86	0	0
Sheathing and Sheets	91	0	0	93	0	0
Bolts	96	0	0	98	0	0
Bottoms	93	0	0	95	0	0
Old	80	0	0	85	0	0
Australian	87	0	0	88	0	0
Wire ₱ lb.	0	1	0¾		—	
Tubes "	0	1	0¾	0	1	1
Brass—₱ lb.						
Sheets	0	0	10	0	0	11
Wire	0	0	10¼	0	0	11
Tubes	0	0	11	0	0	12
Yellow Metal Sheathing	0	0	8	0	0	8¼
Sheets	0	0	7¾			8
Spelter—₱ ton.						
Foreign on the spot	22	5	0	22	10	
" to arrive	22	7	6		—	
Zinc—₱ ton.						
In Sheets	29	0	0	29	5	0
Quicksilver—₱ bottle.	23	0	0		—	
Tin—₱ ton.						
English Blocks	96	0	0		—	
Ditto Bars (in bris.)	97	0	0		—	
Ditto Refined	98	0	0	99	0	0
Banca	99	0	0	100	0	0
Straits	92	0	0	93	0	0
Australian	91	0	0	91	10	0
***Tin Plates—† ₱ box.**						
IC Charcoal.....1 qual.	1	16	0		nom	
IX " .....1 qual.	2	0	0		"	
IC " .....2 qual.	1	15	0		"	
IX " .....2 qual.	2	1	0		"	
IC Coke	1	7	0	1	8	0
IX "	1	13	0	1	14	0
Canada Plates ₱ ton.	19	0	0		—	
" at works	18	10	0		—	

Iron—₱ ton.

Bars Welsh, in London	9	5	0			0
" to arrive	9	0	0	9	5	0
Nail Rods	10	15	0	11	10	0
Nail Rods, Staff'd in L'ndon	11	0	0		—	
Bars	11	0	0	14	0	0
Hoops	12	0	0	13	0	0
Bars at Works	10	0	0	11	0	0
Hoops ditto	11	0	0	14	0	0
Sheets, single, and plates	18	0	0	15	0	0
Pig, No. 1, in Wales	5	0	0	6	10	0
Refined metal ditto	7	0	0	8	0	0
Bars, common ditto	8	10	0		—	
Do, merchant, Tyne or Tees	9	0	0		—	
Ditto, Railway, in Wales	7	0	0	8	0	0
Ditto, Swedish, in London	17	0	0	18	0	0
To arrive	17	0	0	18	0	0
Pig, No. 1, in Clyde	3	15	0	4	5	0
Ditto, f.o.b., Tyne or Tees	4	11	0	5	15	0
Ditto, Nos. 3, 4, f.o.b.	4	10	0	5	10	0
Railway Chairs	5	0	0	5	5	0
" Spikes	12	10	0	14	0	0
Indian Ch'coal Pigs in L'don	10	0	0	12	0	0

Steel—₱ ton.

Swedish, in kegs (rolled)			—			—
Ditto (hammered)	19	10	0	20	0	0
Ditto, in faggots	21	0	0		—	
English, spring	23	0	0	25	0	0

Lead—₱ ton

English Pig, common	21	5	0	21	10	0
Ditto, LB	21	7	6			
Ditto, WB	22		0		0	0
Ditto, Sheet	23	0	0		—	
Ditto, Red Lead	23	0	0	23	10	
Ditto, White	30	0	0	32	0	0
Ditto, Patent Shot	23	0	0	25	10	0
Spanish	21	0	0		—	

* At the works, 1s. to 1s. 6d. per ton less. Terne plates 2s. per box below tin plates of similar brands.
† Add 6s. for each X.

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Flower Pot Stands,
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Manufactured by E. T. BARNUM, Detroit, Mich.
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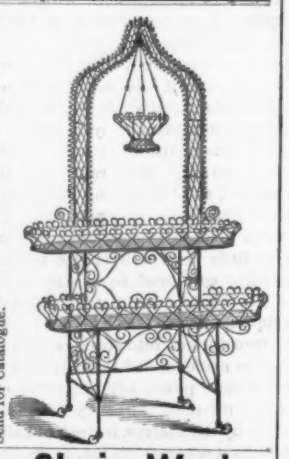

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Dredge and Crane Chain, a specialty.

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Fire-Set Vase,
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WITH INSIDE RESERVOIR.
The cut explains the superior advantages of this New Coal Vase, which for convenience excels all other devices for this purpose. The Vase is very ornamental, being richly decorated. The Arms and Rests for Fire Sett detach to pack inside for shipment. Send for Illustrated Circular to the only manufacturers,
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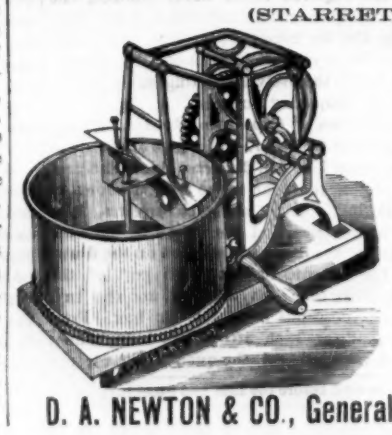
(STARRETT'S PATENT.)



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These Choppes require one-third less power than any other Chopper in market doing the same work, and hence for butchers who have not the use of steam-power are superior to all others. They are warranted to give entire satisfaction.
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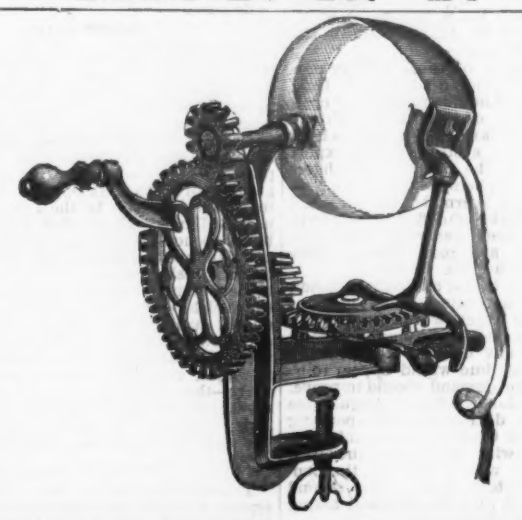

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In neatness and compactness of design, durability and perfection of automatic action, it is unequaled; and it pares with a precision, rapidity and economy hitherto unattained. It is noiseless in its movement, throws the parings clear from the Machine, and acts without snap, spring or jar; thus avoiding that clogging and soiling with parings, and spattering of juice, which are such an annoyance in Machines heretofore in use.
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Securely packed, ONE DOZEN in a case. No charge for packages.
This is undoubtedly the cheapest and best Parer in the Market.
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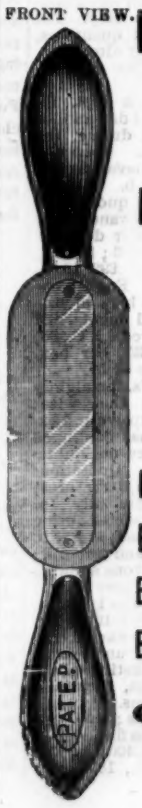

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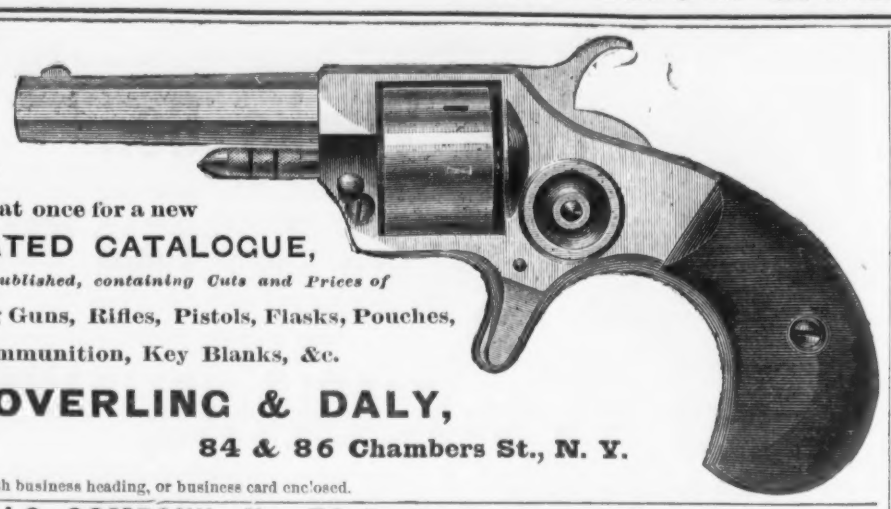

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BARBER RATCHET BRACE.

This Brace has a Lignumvitæ Hand-Sweep, Malleable Iron Cast Steel Jaws, It is beautifully **MOST PERFECT** In places where there is not will drive the bit in or out, without the Ratchet attachment, and will surely come

Pawls and finished, and in **BRACE** room to revolve the sweep, a They cost only 50 cents more

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This is the most powerful Cutter in use, and just what is needed by all retail iron dealers. Also by shipbuilders, manufacturers, and all others having iron to cut. It will cut iron twice as large as any other machine of the same cost.

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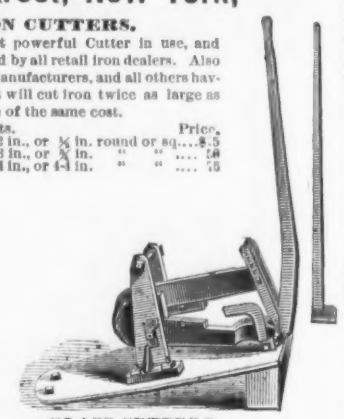
No. 2,	165 lbs.,	⅝x3 in., or ⅝ in. " "	50
No. 3,	312 lbs.,	6-3x4 in., or 4-4 in. " "	75



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BRACKET SAW

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For sale at all Hardware stores.

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In addition to the 20 Cast Steel Tools inclosed in this handle, it will hold anything from an 8 inch Mill File to a Cambric Needle. It is by far the best Tool Holder in use, and will also answer nearly all the purposes of a Hand Vise. The wood is lignumvitæ and hard maple, the ferrule, malleable iron, and the jaws cast steel. Most hardware dealers keep them, or will send to us for them.

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Our Glass Cutters are made with a handle like a Glaziers Diamond, but, instead of the diamond point, they have a small hardened steel revolving wheel, the sharp edge of which cuts nearly as well as a diamond. They are durable, and will give entire satisfaction.

Manufacture **Barber's Bit Braces, Miller's Falls Vises, Little Giant Iron Cutters, Adjustable Chuck Breast Drills, Family Tool Chests, Pratt's Boiler Tube Scrapers, Patent Angular and Ratchet Drilling Machines, Langdon Mitre Boxes.**

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MANUFACTURED BY

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Send for price list. Buffalo, N. Y.

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These **Vises** are only manufactured at the **HOWARD IRON WORKS**, at **Buffalo, N. Y.** and are so stamped. The improvements in these **Vises** which are patented are valuable, and parties who claim to manufacture, and are offering a **Vise** representing it to be the same as the **HOWARD VISE**, are deceiving the Trade.

HOWARD IRON WORKS.

WARRANTED.

The New Double Screw Parallel "Leg" Vise.

We are now ready to furnish, as the result of more than thirty years' experience, our latest style of Vise—the best yet made. It is **Stronger** than any other, whether of Foreign or of American make; always parallel and holding with a tighter "grip." The jaws are of convenient shape for the workman to get near his work equally well for filing or chipping, instead of the heavy, clumsily formed jaws of the cast iron Single Screw Vises of the common "parallel" type, and which depending upon slides alone for preserving parallelism, can never be screwed up very hard without "jamming" on the slides or breaking.

Our New Vise combines all the advantages of the "Peter Wright" Leg Vise, of strength and lightness, fastening to the floor and bench, and at the same time greatly superior to it; is always perfectly parallel at all points of opening, and never gets out of line. Embodying the same general principle as the well known Chain Vise, so long made by us, we have by new, scientific proportioning of all the parts, and with our recently improved metals for their manufacture, obtained so perfect a tool, that we now *warrant* these Vises for *three years*, from date of manufacture stamped upon each.

The Jaws are of best Tool Cast Steel, welded on, file cut and properly hardened. The screws are forged of the best refined iron, and work in *solid cut thread* boxes.

The lower screw maintains the parallel position of the two jaws, by having exact motion with the upper working screw through the connecting chain which regulates it.

The chain is very accurately made of steeled links and rivets, and having no strain of the work upon it, is therefore as durable as all the other parts.

Prices with Special Discounts to the Trade.

No. 1,	Jaws	3¼	in. x	¾	in.	Screws	⅝	in. diameter.	Lever	9 in. long,	Opens 4¼ in. $8 00
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" 3,	"	5¼	in. x 1⅓		in.	"	1¼	in. "	"	16 in. "	" 6¾ in. 17 00
" 4,	"	6¼	in. x 1⅓		in.	"	1⅜	in. "	"	19 in. "	" 7½ in. 22 00
" 5,	"	7	in. x 1⅔		in.	"	1⅝	in. "	"	24 in. "	" 9 in. 30 00
" 6,	"	8	in. x 1⅔		in.	"	1¾	in. "	"	26 in. "	" 10 in. 34 00

All sizes of these Vises furnished with Swivel Attachment, at an additional cost of $1 to $3.

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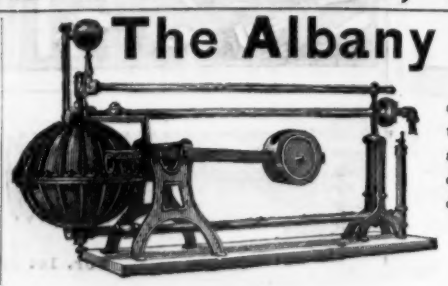

This Trap automatically drains the water of condensation from *Heating Coils*, and returns the same to the Boiler *whether* the Coils are *above or below* the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

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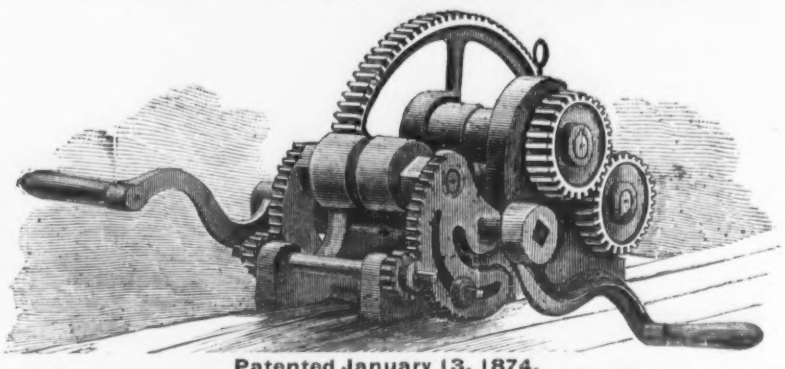

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This Machine is destined to supersede all Tire Benders now in use, especially for heavy work. The middle roller can be readily removed and readjusted, thus allowing Tires to be withdrawn without difficulty after being bent. Fifth Wheels and Tires never slip while being bent in this Machine. One man can bend a Tire 8x1 without difficulty.

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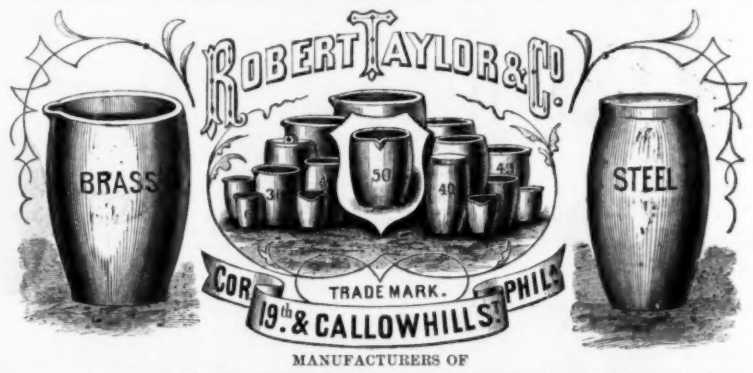

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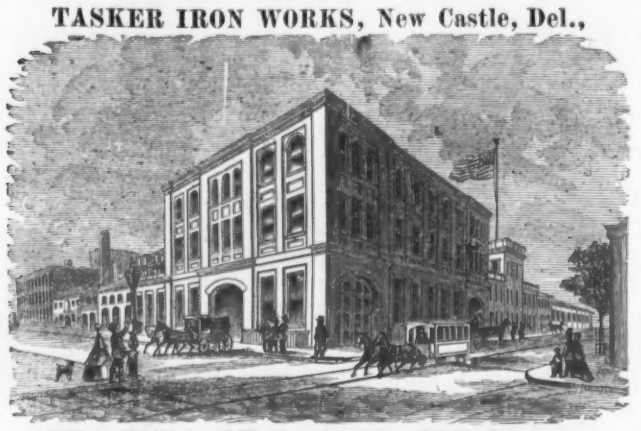

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Angular Extension BORER.

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The socket is arranged so that the strain does not come on the jaws, but on the square hole which fits the shank of the bit. The jaws attached to the sleeve hold the bit firmly in the square, and center it truly. The sweep is of wrought iron. The general finish of the stock is good. Its appearance is neat. Mechanics who have used it unanimously pronounce it superior to all others; and we offer it to the trade as the strongest, most simple, and quickest operating brace in the market. We manufacture five sizes. The number of inches of sweep corresponds with the commercial number of the list.

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Elevator Bolts	Adjustable Plumbs and Levels,	Hasps and Staples,	Tinned Meat Hooks,
Tire Bolts,		Ox Bow Pins,	Can Openers,
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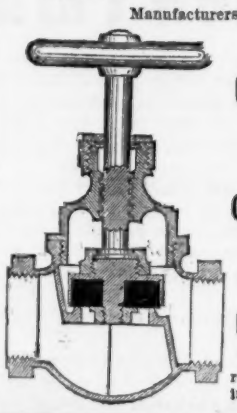

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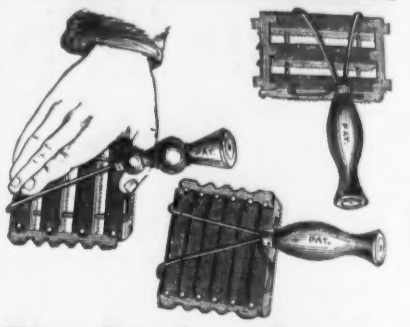

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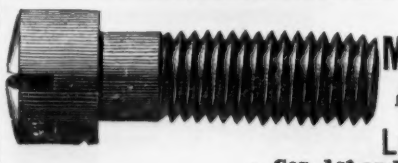

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Ore Crushers.
Blake Crusher Co., New Haven, Ct. 34
Paints.
Rocky Mountain Vermillion Paint Co., Prov., R. I. ..28
Paints and Oils, *Dealers in.*
Devoe F. W. & Co., 117 Fulton, N. Y. ....
Patent Solicitors.
Brieson A. Y., 258 Broadway, N. Y. 16
Howson & Son, Phila. and Washington, D. C. 13
Munn & Co., *Scientific American*, 37 Park Row, N. Y. 29
Picture Nails, etc., *Manufacturers of.*
Richards T. C. & Co., 47 Murray, N. Y. 8
Pipes, Fittings, etc., *Makers of.*
Eaton & Cole, 58 John, N. Y. 22
McNab & Harlin Mfg. Co., 56 John, N. Y. 22
Nelson, Finkel & Co., 439 E. 10th st., N. Y. 22
Pancoast & Maule, 227 Pear, Phila. 22
Chas. Gregg Mfg. Co., 62 and 64 Gold, N. Y. 22
Pipe, Water and Gas, *Makers of.*
Brick R. A. & Co., 112 Leonard, N. Y. 6
Graff William & Co., Pittsburgh, Pa. 22
McNeal John & Sons, Burlington, N. J. 6
Morris, Tasker & Co., 15 Gold, N. Y. 22
National Tube Works Co., 78 William, N. Y. 22
Starr Jesse W. & Sons, Camden, N. J. 6
Warren Foundry & Mach. Co., Phillipsburg, N. J. 22
Wood R. D. & Co., 173 Broadway, N. Y. 22
Piston Packing.
Canfield John & Co., 1321 Fairmount Ave., Phila. 30
Plane Irons. *Manufacturers of*
Buck Bros., Millbury, Mass. 3
H. Chapin's Son, Pine Meadow, Conn 6
Middletown Tool Co., Middletown, Conn. 28
Planes, *Manufacturers of.*
H. Chapin's Son Pine Meadow, Conn. 6
Greenfield Tool Co., Greenfield, Mass. 29
Stanley Rule & Level Co., 83 Chambers, N. Y. 22
Plated Ware.
Rogers & Bro., 208 Broadway 11
Plumbago Lubricator.
N. Y. Black Lead Works, 172 Forsyth, N. Y. 36
Plumbers' Materials, *Manufacturers of*
Carr Wm. S. & Co., 106 Centre, N. Y. 22
Portable and Stationary Forges.
Kellogg Wm. P. & Co., 121 Chambers N. Y. 24
Keystone Portable Forge Co., 120 Exchange place, Philadelphia. 6
Manning H. S. & Co., 111 Liberty, N. Y. 6
Presses, Power. *Makers of.*
Am. Saw Co., Trenton, N. J. 36
The Stiles & Parker Press Co., Middletown, Ct. 34
Pressure Blowers. *Makers of.*
Sturtevant B. F., 72 Sudbury, Boston. 35
Pumps, *Makers of.*
Burlingham & Purdy, 103 Chambers St. 7
Douglas W. & B., Middletown, Conn. 7
Rumsey & Co., Seneca Falls, N. Y. 7
Union Mfg. Co., 99 Chambers, N. Y. 7
Valley Mch. Co., Easthampton, Mass. 7
Pyrometers.
Brown Edward, 311 Walnut, Phila. ....
Railroad Supplies.
Potter, Hoffman & Co., 110 Liberty, N. Y. 6
Rails, *Importers of.*
Congreve Chas. & Son, 104 and 106 John, N. Y. 32
Rails, Iron or Steel, *Makers of.*
Atkins Bros., Pottsville, Pa. 6
Cambria Iron Co., Johnstown, Pa. 5
Cleveland Rolling Mill Co., Cleveland, O. 6
Griswold John A. & Co., Troy, N. Y. 32
Milwaukee Iron Co., Milwaukee, Wis. 6
Razor Straps, *Makers of.*
B. F. Badger, Charlestown, Mass. 3
Rivets.
Old Colony Rivet Works, 116 Chambers, N. Y. 12
Timmes Peter, 231 North 6th, Brooklyn, E. D. 4
Rolling Mill Machinery, etc., *Manufacturers of.*
Birmingham Iron Foundry, Birmingham, Ct. 4
Moore James, Cor. 16th and Buttonwood, Phila. 29
Rolls, Chilled and Sand, *Makers of.*
Garrison A. & Co., Pittsburgh, Pa. 4
Rules, *Manufacturers of.*
H. Chapin's Son, Pine Meadow, Ct. 6
Stanley Rule and Level Co., 83 Chambers St. 22
Sash Weights (sectional), *Manufacturers of.*
Sprague Sash Weight Co., Youngstown, O. 2
Saws, *Makers of.*
Atkins E. C. & Co., Indianapolis, Ind. 10
American Saw Co., Trenton, N. J. 10
Boynton E. M., 80 Beekman, N. Y. 10
Flint J. & Co., Rochester, N. Y. 10
Disston Henry & Sons, Phila. 25
James Ohlen, Columbus, O. 10
Peace Harvey W., Williamsburg, N. Y. 10
Spear & Jackson, 116 Duane, N. Y. 29
Wheeler, Madden & Clemson, Middletown, N. Y. 10
Saw Frames, Wood, *Makers of.*
Boynton E. M. 80 Beekman, N. Y. 10
Peace Harvey W., Williamsburg, N. Y. 10
Scales, *Manufacturers of.*
Richie Bros., 9th near Coates, Phila. 24
Shattuck W. F. & Co., 113 Chambers, N. Y. 8
Universal Family Scale Co., Guilford, Conn. 13
Screws, *Makers of.*
American Screw Co., Providence, R. I. 13
Miles F. S., 226 Quarry, Phila. 12
Screws, *Importers of.*
Bruce Geo. W., 1 Platt, N. Y. 5
Field Alfred & Co., 47 John, N. Y. 28
Gueutal George & Son, 39 W. 4th, N. Y. 10
Shovels, &c.
Clement & Hawks Mfg. Co., Northampton, Mass. 9
Birmingham Shovel Co., 31 Chambers, N. Y. 9
Middleboro Shovel Co., 63 Oliver, Boston. 8
Skates.
Florence Sewing Machine Co., Florence, Mass. 13
Graham & Haines, 83 Chambers, N. Y. 30
Smelting Works.
Reeves Paul S., 760 South Broad St., Phila. 36
Du Plaine & Co., 1303 & 1305 Buttonwood, Phila. 31
Stamped and Japanned Tin Ware.
Scheider Jos. & Co., 58 Beekman, N. Y. 6
Shepard Sidney & Co., Buffalo, N. Y. 27
Sturges Frank & Co., 72, 74 & 76 Lake, Chicago. 3
Steam Hammers, etc., *Makers of.*
Dudgeon Richard, 24 Columbia, N. Y. 34
Snaps, Harness, *Makers of.*
Middletown Tool Co., Middletown, Conn. 28
Spiegel.
Quincy John W., 98 William, N. Y. 2
Spikes, R. R. &c., *Manufacturers of*
Fahrion, G. W., Niles, Ohio. 4
Springs.
Rowland Wm. & Harvey, Frankford, Phila. 36
Squares, Steel and Iron, *Makers of.*
Hart, Bliven & Mead Mfg. Co., 243 Pearl, N. Y. 30
Steam Pumps, etc., *Manufacturers of.*
Carr A. 43 Cortlandt, N. Y. 29
Enterprise Hydraulic Works, 2215 Race St., Phila. 24
Guild & Garrison, Williamsburgh, N. Y. 34
Hall C. Henry & Co., 28 Cortlandt, N. Y. 34
Philadelphia Hydraulic Works, cor. Evelina and Levant, Philadelphia. 35
Steele & Condict, 88 Liberty, N. Y. 29
Steam Traps.
Alonzo L. Jones, 51 S. 4th, Phila. 12
Townsend & Blessing, Albany, N. Y. 21
Steel Castings.
The McHaffie Steel Castings Co., Evelina and Levant Streets, Philadelphia. 16
Steel Importers.
Carr J. & Riley, 82 John, N. Y. 32
Cocker Bros., Sheffield, England. 32
Congreve Chas. & Son, 104 and 106 John, N. Y. 32
Hobson Francis & Son, 97 John, N. Y. 32
Jessop Wm. & Sons, 91 and 93 John, N. Y. 32
Moss F. W., 80 John, N. Y. 32
Pierson & Co., 24 Broadway, N. Y. 4
Sanderson Bros. & Co., 16 Cliff, N. Y. 32
Sanderson Geo. & Co., 57 John, N. Y. 32
Van Wart & McCoy, 43 Chambers, N. Y. 32
Wardlow S. & C., 18 Gold, N. Y. 32
W. Hawksworth, Ellison & Co., 74 John, N. Y. 32

Steel Manufacturers.
Anderson & Woods, Pittsburgh 33
Chrome Steel Co., Brooklyn, E. D. 32
Cleveland Rolling Mill Co., Cleveland, O. 6
Gautier D. G. & Co., Jersey City, N. J. 32
Griswold John A. & Co., Troy, N. Y. 32
Hussey, Wells & Co., Pittsburgh 33
Miller, Barr & Parkin, Pittsburgh 32
Reiter, Sutton & Co., Pittsburgh, Pa. 33
Reese, Graff & Woods, Pittsburgh 33
Rowland Wm. & Harvey, Frankford Phila. 36
Singer, Nimick & Co., Pittsburgh 32
Stone Crushing Machines.
Blake Crusher Co., New Haven, Ct. 34
Stoves.
Burdette, Smith & Co., Troy, N. Y. 24
Wm. Resor & Co., Cincinnati, O. 24
Stove Boards, *Manufacturers of.*
Shepard Sidney & Co., Buffalo, N. Y. 27
Stove Polish, *Makers of.*
"Gem" Stove Polish, 172 Forsyth, N. Y. 36
Twist Drills, *Makers of.*
Morse Twist Drill & Mach. Co., N. Bedford, Mass. 31
Tackle Blocks, *Makers of.*
Burr & Co., 81 Peck Slip N. Y. 4
Penfield Block Works, Lockport, N. Y. 13
Tacks.
American Tack Co., 117 Chambers, N. Y. 13
Field A. & Sons, Taunton, Mass. 9
Grundy & Kenworthy, 165 Greenwich, N. Y. 30
Loring Samuel, Plymouth, Mass. 30
Tea Trays, *Importers of.*
Dickinson Henry, 66 and 68 Reade, N. Y. 11
Tinners' Tools and Machines.
Headley W. L., 35 William, N. Y. 8
Turbine Water Wheels, &c.
Swain A. M., North Chelmsford, Mass. 24
Tube Expanders.
Dudgeon Richard, 24 Columbia, N. Y. 34
Valves, Gas, Water and Steam.
Chapman Valve Co., 75 & 77 Kilby, Boston. 13
Ludlow Valve Mfg. Co., Troy, N. Y. 35
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Backus Vise Co., 78 Beekman, N. Y. 21
Fisher & Norris, Trenton, N. J. 21
Merrill Chas. & Sons, 556 Grand, N. Y. 24
Howard Iron Works, Buffalo, N. Y. 21
Trenton Vise & Tool Works, 101 & 103 Duane, N. Y. 3
Wilson Mfg. Co., 37 Chambers N. Y. 12
Water Filters.
Jewett John C. & Sons, Buffalo, N. Y. 20
Water Meters.
National Meter Co., 95 John, N. Y. 28
Welding Compounds.
Schierloh H., 21 Exchange Place, Jersey City, N. J. ... 3
White Lead, *Manufacturers of*
Brooklyn White Lead Co., 89 Malden Lane, N. Y. ..28

The Ultimate Policy of the Fire Underwriters.

We take the following from the *Journal of Commerce*:

Brevity has its advantages, but it hardly does justice to the interview at Chicago between the representatives of New York fire companies and the local property owners, reported on the 2d instant by telegraph. If what was there alleged to have been said on behalf of the National Board were really true, the quakings of Chicago would be shared by every other city in the Union; and there would arise among policyholders everywhere a feeling of resentment against what seems very like a threat. The Chicago report informs us that "this action (cutting off insurances from Chicago) was only the first step in a systematic effort to apply the same rules to other cities, and it was intimated that other cities would shortly be required to make the amendments that have been demanded of Chicago, and under the same penalty." We learn that the facts are these, and they put the case in a light very different from that above given: The underwriters have for several months been quietly investigating the fire risks of the larger American cities, with a view to procure their diminution. In this work they have the hearty good-will of the public, and should receive encouragement from all the municipal governments. Insurers, insured and non-insured—all persons—have a common interest in the safety of their dwelling places; and every rational suggestion for the promotion of security against the danger of fire must obtain the cordial support of the people. But it is evident to every person of experience and observation that the same cast iron rules should not be imposed upon all cities as the alternative of an entire cessation of insurance risks. Chicago has the unfortunate distinction of being more exposed than any other American city to the ravages of great fires. The high and long continuing prairie winds, the square miles of light wooden houses swept by these gales, the unparalleled disorganization and helplessness of the fire department—these and other special features of the situation at Chicago, made it needful for the underwriters to submit an ultimatum strong and stern. A timid rose-water policy would not do in dealing with an ignorant and obstinate city government like that of Chicago. The result has justified the course adopted. While the city authorities have granted only two of the six demands made upon them, they have set public opinion at work, and the next election will probably replace the corrupt and narrow minded members of the Common Council by men of honest, liberal views, who understand their duty to Chicago. With a well-meaning upright city government installed, we predict that Chicago would find the National Board more complaisant and inclined to relax some of the rules they have been forced to adopt while her fire department remained profligate and worthless under the direct encouragement of the municipal rulers. Until the fire department is reformed from the bottom, the Board is justified in exacting all the published conditions from Chicago. As for other cities, less exposed than Chicago to great fires, and having serviceable fire departments, they should be, and doubtless will be, exempt from some of the requirements made on Chicago. It would not be just or necessary for example, to demand of all cities that they should tear down or remove every wooden building standing in the midst of more solid structures, or that they should order away the lumber yards to isolated localities, or that they should establish and pay for a fire marshal bureau, under penalty of withdrawing insurances from the place refusing to do these things. Cities having an effective fire corps and an ample supply of water, and not exposed to raging winds for some months in the year, are not specially endangered by the presence of wooden buildings here and there, or lumber yards, or other risks; and it would be absurd for the National Board of Underwriters to enforce against such cities the full rigor of the Chicago terms. As we understand their purposes, they intend to do no such thing. They are aiming not at the impracticable and the unreasonable, but at the accomplishment of feasible and judicious reforms, which will meet the views of the whole public—these reforms not to be of one unvarying type, but different according to the needs of different cities. Of this city, it is promised that very few changes will be asked. Policy holders here have shown themselves so ready to comply with all reasonable suggestions of the underwriters, the fire department is so near perfection, and the water supply so good (but it ought to be made better), that even the sharp-eyed agents of the Board find but little to complain of. If the Board, however, does see any existing defect in the measures of protection against fire, we hope they will speak out frankly, and we promise that policy-holders and tax-payers will not resent or neglect the suggestion.

The Catasauqua *Dispatch* says: The Union Foundry and Machine Company made a casting last week which weighed about seven tons. It was the bed plate for the shears in the rolling mill in this place of the Catasauqua Manufacturing Company. This is a success for the machinists of Catasauqua, of which they may well be proud. The work of making a casting of this size (almost 14,000 pounds) is very difficult and requires good management and care, and yet the job was performed with the greatest ease and precision. The plate is perfect in every particular, and Mr. David Williams, who superintended the casting, is to be congratulated. He tells us that this is the largest cast made in Catasauqua, the next in size weighing six tons, and is a piece of the same machine. Allentown attempted an eight-ton casting a few weeks ago, and three trials were made before they were successful.

A. M. SWAIN, MECHANIST,

North Chelmsford, Middlesex County, Mass.,

Attends Personally to the Improvement of

WATER POWER AND MACHINERY.

TURBINE WHEELS,

And a large variety of other Machinery Manufactured in Wood and Metal. Power Weighed, Water Measured, and Plans and Specifications prepared.

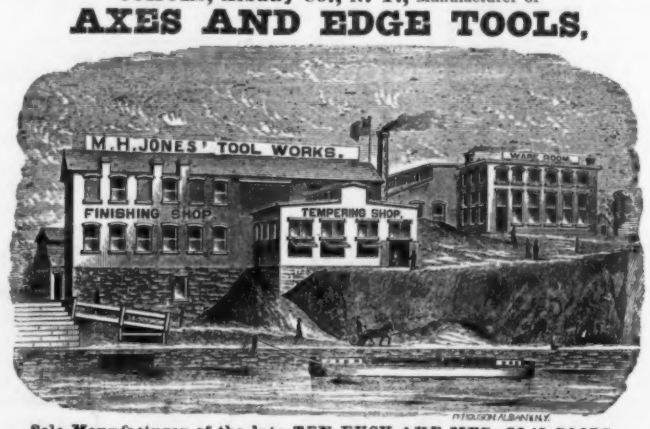
REFERS BY PERMISSION TO

James B. Francis, C. E., Engineer of Lowell Co.'s, Lowell, Mass.
George Richardson, Supt. Lowell Machine Shop, Lowell, Mass.
Charles L. Hildreth, Foreman Lowell Machine Shop, Lowell, Mass.
A. J. Hiscox, Prest. Hiscox File Mfg. Co., Lowell, Mass.
John Rhodes, Warp Manufacturer, Millbury, Mass.
Hiram F. Mills, C. E., Engineer Essex Co., Lawrence, Mass.
Jonas Kendall, M. E., South Framingham, Mass.
James Emerson, Dynamical Engineer, Holyoke, Mass.
Holyoke Paper Co., Paper Manufacturers, Holyoke, Mass.
Chas. S. Bliven, Willimantic, Conn.

M. H. JONES,

COHOES, Albany Co., N. Y., Manufacturer of

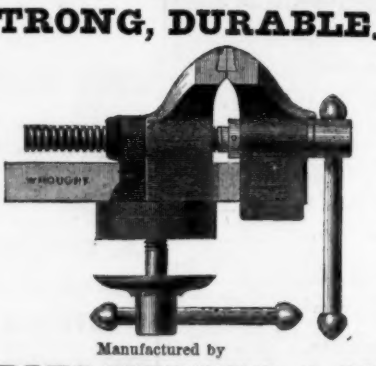
AXES AND EDGE TOOLS,



Sole Manufacturer of the late TEN EYCK AXE MFG. CO.'S GOODS.
J. CLARK WILSON & CO., New York Agents, 81 Beekman Street.

PARALLEL SWIVEL VISE,

STRONG, DURABLE.



Wrought Iron Bar. Width of Jaw.	Weight.	Solid Box. Price.
4 in.	50 lbs.	$11·00
5 "	80 "	13·00
6½ "	130 "	17·00
8	167 "	22·00

Manufactured by

CHARLES MERRILL & SONS,
556 Grand Street, NEW YORK.

NORWICH LOCK MFG. CO.,

NORWICH, CONN.

Agencies:

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(Estate of R. J. DEWHURST, deceased.)

JOHN COCHRANE, Executive Agent and Manager,

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Bolts, Nuts, Turnbuckles, Washers, Forgings, &c

The attention of large consumers solicited.

RIEHLE BROTHERS,

Ninth Street, near Coates, Philadelphia.
New York Store, 93 Liberty Street.
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"Patented" Furnace Charging Scale.

Double Beam R. R. Track Scale, Compound Parallel Crane Beams, &c. Patented First Power Lever Wagon Scales. Testing Machines any capacity.

WM. RESOR & CO., Cincinnati,

Manufacturers of the

Awarded the First Premium, Illinois State Fair, 1874.

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FASHION for Wood.

With or without Iron Clad, Copper Low Reservoir, and the Celebrated

MONITOR Coal and Wood Cook.

The Celebrated DUBUQUE.

Acknowledged by all to be the

1. It is all cast iron—simple in its construction, and no machinery to get out of order. 2. It is a perfect gas and smoke burner. 3. It is the most powerful heater. 4. The fire is under perfect control at all times. 5. It combines the revertible flue and exposed fire chamber. 6. It ven tilates the room perfectly. 7. No dust or ashes escape into the room while managing it. 8. Has shaking and dumping grate with ash drawer. 9. The fire-pot being exposed to the cold air, will outlast any in use. 10. The fire will keep from 30 to 50 hours without replenishing. 11. The parts directly exposed to the fuel can be replaced with but little trouble and expense. 12. Its operation is perfect with the poorest coal found in the West. 13. All parts of the base are heated perfectly. 14. Its beauty of design gains for it admission into any parlor. 15. It is especially adapted use of a Tea-kettle, from which boiling water can be had in a few moments.

Standard Soft Coal Burner of the West.

The Manufacturers have made it a specialty for the past six years. It is guaranteed in every respect to be a perfect Soft Coal Burner and without a rival. Send for Samples and Catalogue to

BURDETT, SMITH & CO., 253 River St., Troy, N. Y., 538 S. Clark St., Chicago, Ills.
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JOHN G. ROLLINS & CO., Old Swan Wharf, London, England.

The "EMPIRE" Fan Blowing Portable Forges,

With or without Hood.

(Patented Nov. 25, 1873.)

WITHOUT BELTS OR BELLOWS.

It is more Easily Worked, gives a Better Blast, and is the Cheapest Forge made.

☞ IT HAS NO BACK DRAUGHT.

Manufactured by W. P. KELLOGG & CO., Troy, N. Y.

Also Curry Combs, Boring Machines, & Cooler's Whip Racks, etc.

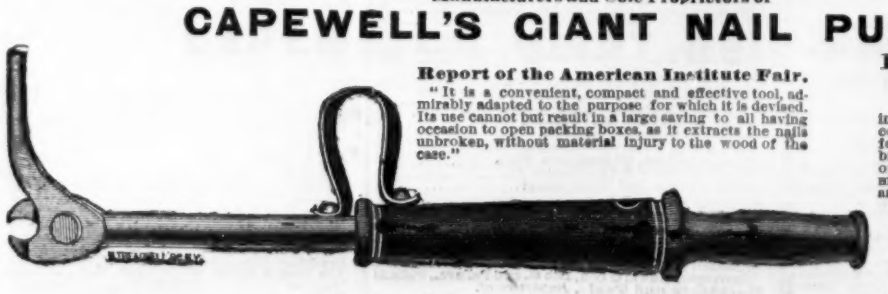
N. Y. Depot for Curry Combs, &c., with F. WIEBUSCH, 84 Chambers Street.

N. Y. Depot for Forges, with GEO. PLACE & CO., 121 Chambers & 103 Reade Streets.

MALTBY, CURTISS & CO., Waterbury, Conn.,

Manufacturers and Sole Proprietors of

CAPEWELL'S GIANT NAIL PULLER.



Report of the American Institute Fair.

"It is a convenient, compact and effective tool, admirably adapted to the purpose for which it is devised. Its use cannot but result in a large saving to all having occasion to open packing boxes, as it extracts the nails unbroken, without material injury to the wood of the case."

Reasons why you should Use the Nail Puller.

1st. The edges of the boxes are never split or injured. 2d. No broken Nails in the box or cover. 3d. The box and cover remain sound for future use. 4th. Nails are drawn without breaking or bending. 5th. The box can be opened in half the time required by the old method with chisel or crane. Send for prices, and other information, to

MALTBY, CURTISS & CO.,
Hardware Commission Merchants,
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HENRY DISSTON & SONS,
Keystone Saw, Tool, Steel and File Works,

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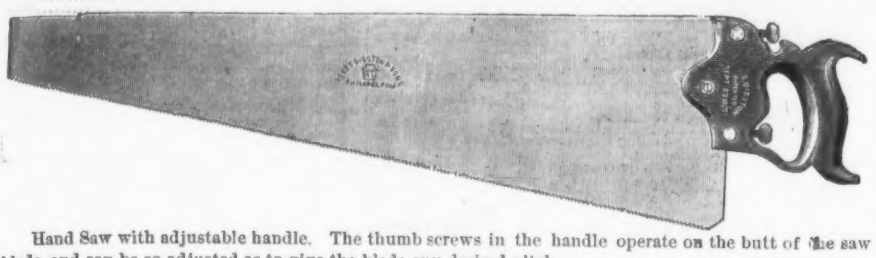
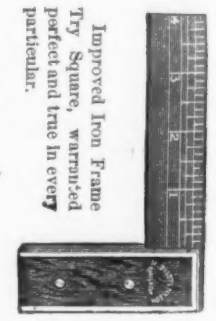
Manufacturers of SHEET STEEL, and all Articles made from Sheet Steel.

SAWS OF EVERY DESCRIPTION.

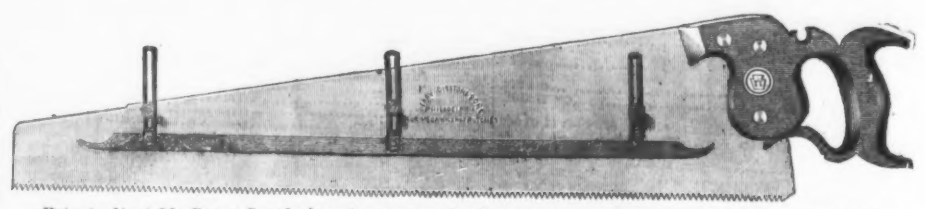
Also, FILES, TOOLS, Etc., and all kinds of Labor Saving Implements for keeping Saws in perfect order.



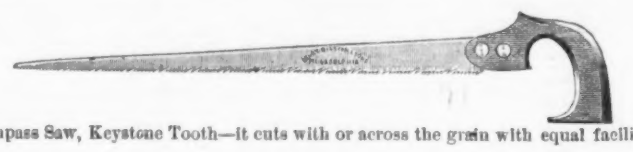
Hand Saw with adjustable handle. The thumb screws in the handle operate on the butt of the saw blade, and can be so adjusted as to give the blade any desired pitch.



Improved Iron Frame Try Square, warranted perfect and true in every particular.



Patent adjustable Gauge Saw for sawing tenons, kerfing, or any work where the cut is required to be of definite depth. Will pay for itself in one day. Try it and be convinced. Remove the gauge and use as an ordinary saw.



Compass Saw, Keystone Tooth—it cuts with or across the grain with equal facility.

Hack Saw. The blade in this Saw is reversible, an advantage which will be readily appreciated by mechanics

READ, MARK, LEARN.

We guarantee our Cross-Cut Saws to do more work, day in and day out, the season through, than any other saw in the market.

The test of practical experience has been ap-

plied, the verdict given, the fiat has gone forth, and the Humbugs are fast fizzling out, while our rapidly increasing sales testify to the esti-

mation in which these saws are held.

We pledge ourselves that no effort shall be wanting to keep up the standard and reputation of our manufactures.

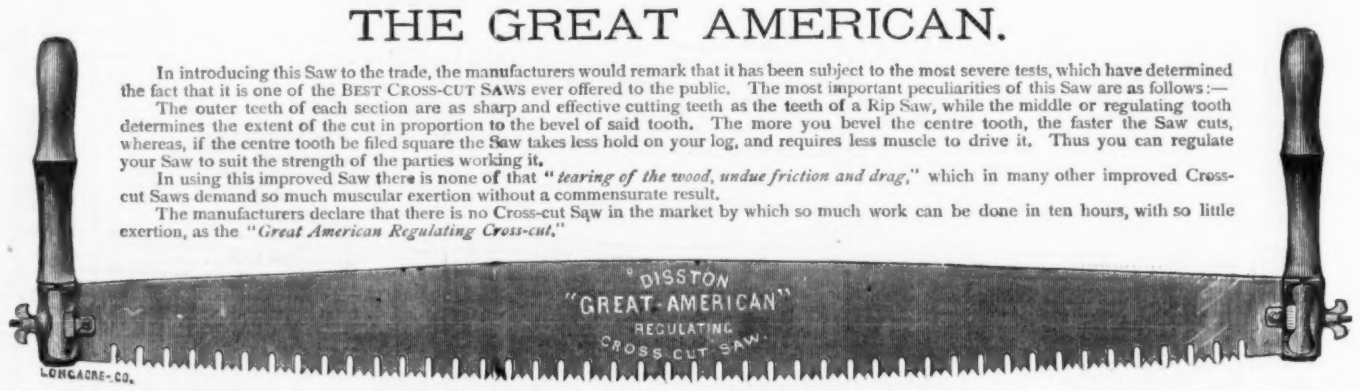
THE GREAT AMERICAN.

In introducing this Saw to the trade, the manufacturers would remark that it has been subject to the most severe tests, which have determined the fact that it is one of the BEST CROSS-CUT SAWS ever offered to the public. The most important peculiarities of this Saw are as follows:—

The outer teeth of each section are as sharp and effective cutting teeth as the teeth of a Rip Saw, while the middle or regulating tooth determines the extent of the cut in proportion to the bevel of said tooth. The more you bevel the centre tooth, the faster the Saw cuts, whereas, if the centre tooth be filed square the Saw takes less hold on your log, and requires less muscle to drive it. Thus you can regulate your Saw to suit the strength of the parties working it.

In using this improved Saw there is none of that "*tearing of the wood, undue friction and drag*," which in many other improved Cross-cut Saws demand so much muscular exertion without a commensurate result.

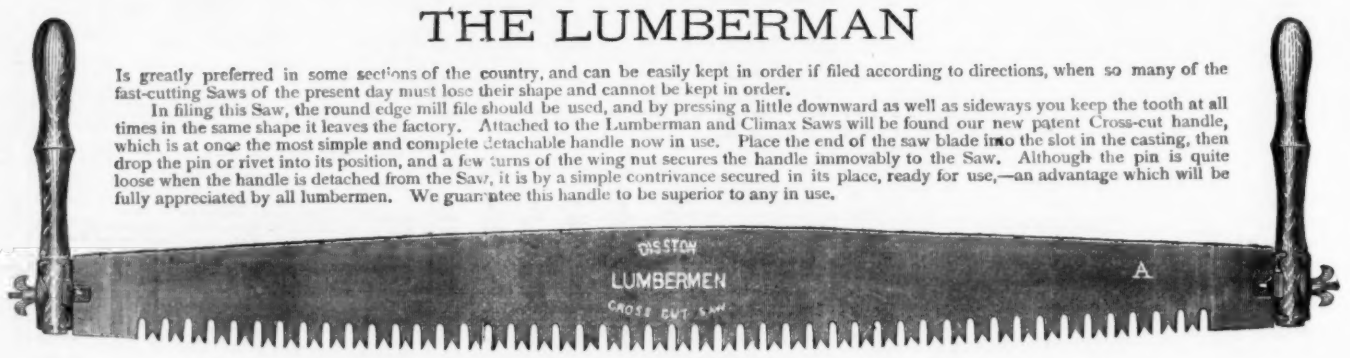
The manufacturers declare that there is no Cross-cut Saw in the market by which so much work can be done in ten hours, with so little exertion, as the "*Great American Regulating Cross-cut.*"



THE LUMBERMAN

Is greatly preferred in some sections of the country, and can be easily kept in order if filed according to directions, when so many of the fast-cutting Saws of the present day must lose their shape and cannot be kept in order.

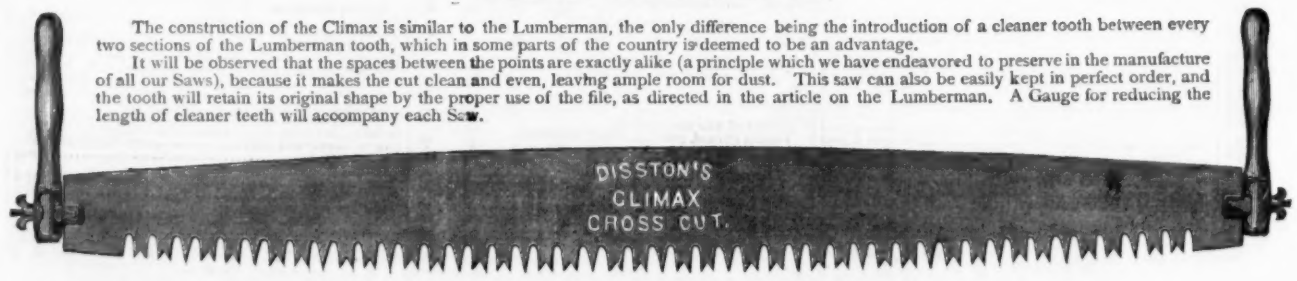
In filing this Saw, the round edge mill file should be used, and by pressing a little downward as well as sideways you keep the tooth at all times in the same shape it leaves the factory. Attached to the Lumberman and Climax Saws will be found our new patent Cross-cut handle, which is at once the most simple and complete detachable handle now in use. Place the end of the saw blade into the slot in the casting, then drop the pin or rivet into its position, and a few turns of the wing nut secures the handle immovably to the Saw. Although the pin is quite loose when the handle is detached from the Saw, it is by a simple contrivance secured in its place, ready for use,—an advantage which will be fully appreciated by all lumbermen. We guarantee this handle to be superior to any in use.



THE CLIMAX.

The construction of the Climax is similar to the Lumberman, the only difference being the introduction of a cleaner tooth between every two sections of the Lumberman tooth, which in some parts of the country is deemed to be an advantage.

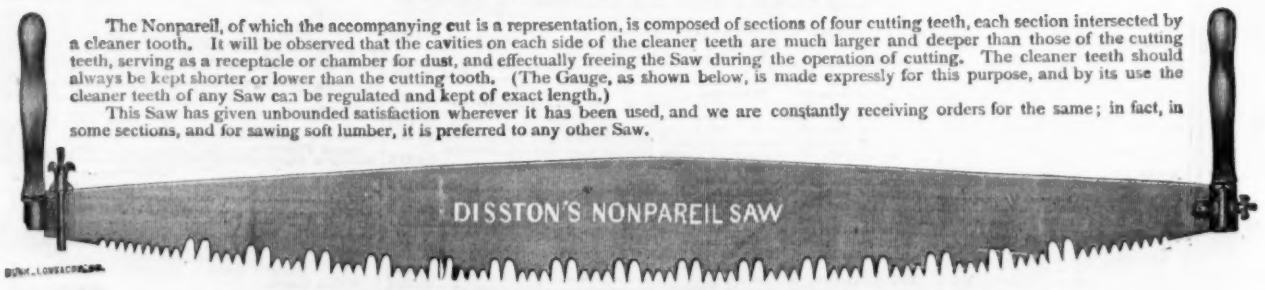
It will be observed that the spaces between the points are exactly alike (a principle which we have endeavored to preserve in the manufacture of all our Saws), because it makes the cut clean and even, leaving ample room for dust. This saw can also be easily kept in perfect order, and the tooth will retain its original shape by the proper use of the file, as directed in the article on the Lumberman. A Gauge for reducing the length of cleaner teeth will accompany each Saw.



THE NONPAREIL.

The Nonpareil, of which the accompanying cut is a representation, is composed of sections of four cutting teeth, each section intersected by a cleaner tooth. It will be observed that the cavities on each side of the cleaner teeth are much larger and deeper than those of the cutting teeth, serving as a receptacle or chamber for dust, and effectually freeing the Saw during the operation of cutting. The cleaner teeth should always be kept shorter or lower than the cutting tooth. (The Gauge, as shown below, is made expressly for this purpose, and by its use the cleaner teeth of any Saw can be regulated and kept of exact length.)

This Saw has given unbounded satisfaction wherever it has been used, and we are constantly receiving orders for the same; in fact, in some sections, and for sawing soft lumber, it is preferred to any other Saw.



Plain Truths for Practical Men.

We guarantee our Cross-Cut Saws to do more work, day in and day out, the season through, than any other saw in the market.

The test of practica experience has been ap-

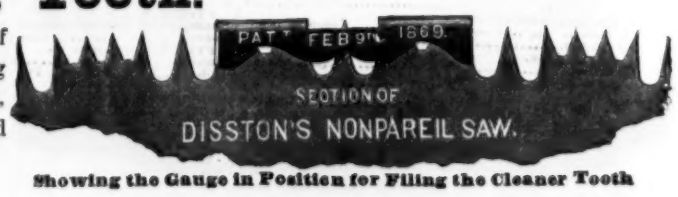
plied, the verdict given, the fiat has gone forth, and the Humbugs are fast fizzling out, while our rapidly increasing sales testify to the es-

timation in which these saws are held.

We pledge ourselves that no effort shall be wanting to keep up the standard and reputation of our manufactures.

Gauge for Regulating Cleaning Teeth.

The cleaning teeth of all saws should be somewhat shorter than the cutting teeth, and, although shortened, they should be of uniform length throughout. The inner edge of the Gauge rests on the points of the cutting teeth, the cleaning teeth projecting through the opening in centre of Gauge. Reduce the projecting points, by means of a file, until arrested by the edges of the Gauge, which is made of hardened steel. Thus tooth after tooth can be rapidly and correctly reduced to an even length by any unskilled operator



Showing the Gauge in Position for Filing the Cleaner Tooth

New York Wholesale Prices, October 7, 1874.

HARDWARE.

Anvils.
Solid Cast Steel.....₱ ℔ 14c
Wright's.....₱ ℔ gold 13c; over 250 ℔s 12½c, gold
Armitage's Mouse Hole.....gold 11c
Wilkinson's.....₱ ℔ gold 11½c
Eagle Anvils, ₱ ℔ lic currency.....dis 15&10 %

Apple Parers.
Domestic.....
Turn Table.....
Lightning.....
Hudson's.....} $7 @ 9 ₱ doz
Reading.....
Union.....
Skeleton Paring, Coring and Slicing.....

Turn Table, old style.....$6·75 dis 10 %
Bay State, Paring, Coring and Slicing.....$15 00 dis 5 %
Climax Slicer.....8 00
Bay State Peach Parer.....$11 00 @ 11 50
Lightning " .....11 00 @ 11 50
Peach Stoner and Halver.....7 00

Augers and Bits.
Douglass.....
Ives.....
Beecher.....1st quality.....dis 25, 10&10 %
Griswold.....2d quality.....dis 25, 10, 10&5 %
Challenge.....
Noble.....

Snell Mfg. Co.....dis 15 @ 20 %
Russell Jennings.....dis 10 %
Douglass Mfg. Co. Hollow Augers.....25&10 %
Cushman's Expanding Hollow Augers.....dis 20 %
Ives Gouge Lip Augers and Bits.....dis 30&10 %
" Hollow Augers.....dis 25&10 %
" Expansive Hollow Augers.....dis 40 %
" Expansive Bits.....dis 20&10 %
Andrews' Bits.....dis 25 %
Clark's Expansive Bits.....dis 15 %
Cook's Patent Augers.....dis 50 %
" " Bits.....dis 40&10 %
Shepardson's Double Cut Bits.....dis 40&10 %
Griswold's Patent.....dis 20 %
Gimlet Bits.....dis 20 %
Long Augers.....new list dis 40 %
Bonney's Patent Hollow.....$48 per doz—dis 25 %
Stearns' " " .....$48 per doz—dis 25 %
Morse's Bit Stock Drills.....dis 20 %
L'Hommedieu's Ship Augers.....dis 15 %
Watrous Ship Augers.....dis 15 %
Vaughan's Post Hole—
6 in. $23 60; 9 in. $35 per doz.....dis 20 %

Awls and Tools.
Aiken's.....dis 25 %
Nos. 42 and 43.....dis 35&10 %

Axes.
Brook's.....per doz $12 00 @ 14 00 net
Blood's.....per doz $12 50 @ 14 00
Hunt's.....₱ doz $14 00 @ 19 00 dis 5&5&5 % cash
Collins'.....₱ doz 11 00 @ 15 50 net @ dis 5 %
Hurd's.....₱ doz 12 50 @ 13 50
Schweitzer Mfg. Co.'s.....₱ doz 13 00 @ 15 00
Simmons'.....₱ doz 11 00 @ 11 50
Morris'.....₱ doz 12 00 @ 12 50
Red Jacket.....₱ doz 11 50 @ 13 00
Mann's.....₱ doz 21 50 @ 22 00
Louisville Bitted.....₱ doz 13 00 @ 14 50
Lowell Tool Co., "Peerless".....₱ doz 12 00 @ 13 00
Underhill's.....₱ doz 12 50 @ 13 50
" Crown.....₱ doz 12 50 @ 15 50
John Leverett's.....
Ten Eyck.....₱ doz $11 00 @ 12 50 net

Balances.
Chatillon's.....dis 22½ %
Frary's.....dis 15 %
Morton's.....dis 15 %

Bands.
Plated.....new list dis 50&5 %
Iron Rim.....new list dis 25&5 %
Brass (Plated list).....new list dis 50, 10&5 %
Oroide.....new list dis 50&5 %

Bells.
Hand, Light Brass.....dis 65, 5&10 %
Hand Ex. Heavy.....dis 40&10 %
White Metal.....dis 50&10 %
Sheep.....dis 25 %
Wiss.....dis 50 %
Globe.....dis 15&10 %
Abbe's.....dis 15&10 %
Taylor's Patent Door.....dis 25 %
Western Gong.....dis 25 %
Brook's Crank.....revised list dis 50 %
" Pull.....revised list dis 50 %
Hart Mfg. Co., Crank and Pull.....dis 50&10 %
Cow—Common Wrought.....dis 20&10 %
" Western.....new list dis 20&10 %
" Kentucky "Star".....new list dis 20&10 %
" Dodge's Genuine Kentucky.....new list dis 35 %
" Yaw's Genuine.....dis 30 %
" Texas.....dis 35 %
Call.....dis 15 %

Bellows.
Blacksmiths'.....dis 20 %
Moulders'.....dis 15 %
Hand Bellows.....dis 10 %

Blind Adjusters.
Domestic.....₱ doz $3—dis 20 %

Blind Fasteners.
Mackrell's.....dis 30 %
Van Sand's.....₱ gross $14 00
Washburn's Patent.....gross 14 00
Merriman's.....new list net

Blind Staples.
Boardman's Patent, ¼ in. and larger.....₱ ℔ 37 c
" ⅜ in....." 42 c

Bolts.
Carriage and Tire, Ætna Nut Co.....dis 60 %
Stove, Ætna Nut Co.....dis 10&5 %
Cast Iron Barrel, Shutter, &c.....new list dis 60, 10&10 %
Wrought Iron Barrel.....new list dis 50, 10&10 %
" " Square.....new list dis 50, 10&10 %
Wrought Iron Flush.....dis 15&10 %
Carriage and Tire, Common.....dis 75&10 %
" " " Norway Iron.....dis 50&10 %
Star, Philadelphia.....dis 50 @ 50&10 %
Eagle, Philadelphia.....dis 50 @ 50&10 %
Philadelphia Pattern, P. S. & W.....dis 50&10 %
Tire, Bessemer Steel, Hubbard & Curtiss.....dis 50 %
Carriage and Tire, H. B. & W.....old list dis 50&10 %
Plow, H. B. & W.....dis 30 %
Stove, H. B. & W.....dis 20 %
" Shelton Co. Shaved Heads.....dis 20 %
Union Nut Co., old list.....dis 50&2½&5 %
" " Stove.....dis 15 %
Machine.....dis 40 @ 45 %

Borax.
.....by case, 15c.; less, 17c. ₱ ℔

Boring Machines.
Kellogg's.....dis 15 %
Snell Mfg. Co., Rice's Patent.....dis 30 %
" " Regular.....dis 30 %
Douglas Mfg. Co.....dis 20&10 %
Morticing Machines each.....$18 00

Bow Pins.—Union Nut Co., new list.....dis 50&10&5 %

Braces.
Hildreth's Patent.....dl 40, 10&5 %
Carter's Patent.....dis 40&5 %
Q. S. Backus.....dis 40&10 %
Wilson Mfg. Co.....new list dis 10 %
Spofford's Patent.....dis 40&5 %
Noble's Patent.....dis 40&5 %
Bartholomew's American Ball.....dis 10&10 %
" Patent Grip.....dis 40 %
Ives' Novelty.....dis 40&5 %
Common Ball.....dis 15&10 %

Bracelets.
Shelf.....dis 60&10 %

Bull Rings.—Union Nut Co., new list.....dis 50&10&5 %

Bung Hole Borers.
Common and Ring.....dis 25 %
Enterprise Mfg. Co.....dis 20&10 %
Ives' Tap Borers.....dis 25 %

Butchers' Cleavers.
Humason & Beckley Mfg. Co.....dis 20&10 %
Israel's.....dis 25 %
Beatty's.....new list dis 20 %

2	3	4	5	6	7	8	9
$19·00	$21·50	$24·00	$27·00	$30·00	$33·50	$36·50	$40·00

Hart Mfg. Co.....dis 45&10 %

0	1	2	3	4	5	6
$25·25	$29·75	$30·25	$38·75	$43·55	$48·50	$54·00

Butts.
Wrought Brass.....new list dis 30 %
Cast Fast Joint, Narrow.....dis 50&5 %
" " Broad.....dis 50&5 %
Cast Loose Joint.....dis 60&10 %
" " Mayer.....dis 50&5 %
" " Parliament.....dis 50&5 %
Drilled Wire Jointed—
Narrow.....dis 55&10 %
Broad.....dis 50 %
Loose Joint.....dis 60 %
Mayer's.....dis 10&10 %
Parliament.....dis 40&10 %
Loose Pin.....dis 55&10 %
Wrought Fast Joint, Narrow.....dis 30 %
Wrought Broad.....dis 35 %
" Loose Joint.....dis 35 %
Wrought Table and Back Flaps.....dis 3 %
Lull & Porter's Blind Butts.....dis 40 %
Palmer Blind Butts.....dis 30&10 %
Nicholson Blind Butts.....dis 40&10 %
Parker's Blind Butts.....dis 55&10 %
Huffer's Blind Butts.....dis 33⅓&10 %
Clark's Surface Blind Hinges. Nos. 1, 3 and 5.....dis 5&10 %
" " " " No. 40 and 50.....dis 50&5 %
" " " " No. 20.....dis 60 %
" Mortise " " 2, 4, 4½, 6, 8, 10.....dis 33 %
Seymour's.....dis 50&5 %
Shepard's.....dis 50&5 %
Garretson's. No. 1, dis 50&10 %; Nos. 2 and 7, dis 50&5 %
The American Spiral Spring Butt Co.....dis 30 %
Standard.....dis 50&5 %

Caps—Percussion, per 1000.
G. D.....37 @ 40c
Eley's E. B.....1-4s, 58c.; 1-10s, 60c., gold
" Double Waterproof, 1-4s, $1·45; 1-10s, $1·52½c., gold
" Colt's.....1-10s 70c., gold

Carpet Sweepers.
Union.....each $2 75 net
Welcome.....each 2 75 net

Cartridges.
Metallic.....dis 50&10 %

Cards.—Horse and Curry.....dis 50&10 %
Cotton.....new list dis 10&10 %
Wool.....new list dis 10&10 %

Carpet Stretchers.
P. S. & W.....per doz $2 00; dis 40&5 %

Casters.
Bed.....dis 30&10 %
Plate.....dis 40&10 %
Sewing Machine.....dis 70&10 %

Cattle Leaders......new list dis 60&10 %

Chain
English Coil.....net gold

₱ ℔	.13	9¾	9	8½	8¼	8c
	5-16	⅜	5-16	⅜	7-16	½

Trace, 6½-10-2.....by the cask, ₱ pair, gold, 58c
Trace, 7-10-2.....by the cask, ₱ pair gold, 63c
Galvanized Pump Chain.....₱ ℔ 14c
German Halter Chain.....new list, Jan. 1, dis 20 %
German Coil.....new list, Jan. 1, dis 20 %
Jack Chain, Iron.....dis 50 %
" Brass.....dis 40 %

Chalk.
White.....₱ gross, 50c
Red.....₱ gross, 75c
Blue.....₱ gross, 90c
Crayons.....₱ gross, 14c

Cherry Stoners.
Family.....₱ doz $8·50

Chisels.
Socket Firmers.....dis 60&10 %
Socket Framing.....dis 60&10 %
Socket Corner.....dis 60&10 %
Tanged Firmers.....dis 45&10 %
Butcher's.....$5·50 to £ gold—new list
Newbould's.....$5·50 to £ gold
Spear & Jackson's.....$5·50 to £ gold—new list

Clamps.
Cabinet.....dis 60&10 %
Judd's.....dis 45&10 %
Lambert's.....dis 20 %
Providence Tool Co.....dis 10 %

Clips, Axle.
Norway or Best.....dis 30 %
Superior.....dis 50 %
"Star," Superior, Philadelphia.....dis 45&5 %

Coal Shovels.
Iron Handled.....₱ doz, $ 85 @ 1 25
Wooden Handled.....₱ doz, 1 00 @ 2 00

Coal Hods.—Smith, Burns & Co.....dis 15 @ 25 %

	14	15	16	17	18	inch.
Japanned	$6·00	6·35	6·75	7·50	8·00	per doz.
Galvanized	9·50	10·00	10·75	11·50	12·50	"

Morning Glory Funnel Hods—

No.	15	16	17	
Japanned	$9·00	10·50	12·00	per doz
Galvanized	13·00	14·50	16·00	"

Sidney Shepard & Co.'s new list.....dis 10 %

Cockeyes.
.....dis 30 %

Cocks.
Brass Racking.....dis 20&10 %
Lock and Globe.....dis 2,&10 %

Coffee Mills.
Board and Box.....dis 15 %
Increase Wilson's.....new list dis 15 %
Selsor's Pat.....$9·50, $10·50—dis 25 %
French Steel.....dis 15 %
The Swift.....dis 25 %
" American".....dis 20 %
Enterprise Mfg. Co.....dis 20&10 %
Diamond, per doz $4 (4).....dis 10 %

Compasses and Dividers.
Bemis.....dis 35 %
Cook's.....dis 15 %
Excelsior.....dis 30 %
Peck Stow & Wilcox.....dis 25 %

Coopers' Tools.
Bradley's.....dis 15 @ 20 %
Chas. E. Little.....dis 20 @ 25 %
Swan & Brombacher.....dis 15 @ 20 %

Corkscrews......dis 25 %

Corn Knives and Cutters.
Bradley's.....dis 10 %

Croquet.—Phineas Smith.....dis 40&10

Crow Bars.
Cast Steel.....₱ ℔ 11c. net
Iron, steel points.....₱ ℔ 6c

Crucibles.
Gautier & Co.....₱ No. 5½c
Curling Irons.....dis 20&10 %

Curry Combs.
Hotchkiss' and Kellogg's, Iron and Brass.....dis 20&10 %
Fitch's.....dis 15&10 %
Rubber.....₱ doz, $9·00—dis 15 %
Schweitzer Mfg. Co.....dis 20 %
The Lawrence Curry Comb Co.....dis 30 %

Curtain Pins.
Silvered Glass.....old list dis 53⅓ %

Cutlery.
American Table.....net list
American Pocket.....dis 25 %
Am. Pocket—Humason & Beckley Mfg. Co.....dis 20&10 %

Dippers.
Britannia.....per doz 7·50—dis 30 %; by bbl. dis 33⅓ %
Cocoa, Plain.....per doz $3·25—dis 30 %
" Rimmed.....per doz 3·75—dis 30 %

Dog Collars.
Embossed Gilt.....dis 20 %
Leather.....dis 20 %

Door Springs.
Gray's.....$7·50 ₱ doz—dis 50 %
Torrey's Patent.....$7·50 ₱ doz—dis 50&10 %
Palmer's Japanned No. 6.....₱ doz $5·00
" Copp'ered " .....6·00
" Silvered " .....8·00

Challenge.—

Japanned	₱ doz $4 00 @ 6 00
Bronzed	₱ doz 5 00 @ 7 00
Nickel Plated	₱ doz 6 50 @ 9 00
1 Gross lots	dis 10 %
5 Gross lots	dis 20 %
Gem.—No. 1 large	per doz $4·00
No. 2 medium	per doz 3·50
No. 3 small	per doz 3·00

Drawing Knives......dis 60 @ 60&10 %

Drills.
Bradley's.....dis 25 %
Adjustable Handled.....dis 15 %

Drills.
Ingersoll's Ratchet.....dis 25 %
Moore's Triple Acting Ratchet.....dis 20 %
Bench—Whitney's Ratchet.....dis 20 %
Blacksmiths'.....each $1 75—dis 60&10 %

Drill Chucks.
The Danbury.....each 10·00—dis 25 @ 30 %

Drug Stoples and Jars.
American Drug Mills.....dis 20 %

Egg Beaters.
Monroe's.....8 in. 10 in.
Per doz $8·00 9·00 .....dis 10 %
Dover.....₱ doz net $6·00
National.....₱ doz $4·50—dis 20 %
Peerless.....₱ doz $4·00—dis 10 %

Emery.
Genuine Chester—Regular Nos.....₱ ℔ 7c
" Flour and FF.....₱ ℔ 4c
Washington Mills—Regular Nos.....₱ ℔ 8c
" Flour.....₱ ℔ 5c

Enameled and Tinned Ware.
Kettles.....dis 35 %
Sauce Pans.....dis 25 %
Glue Kettles.....dis 20 %
Tinned Saucepans.....dis 25 %

Escutcheons.
Brass Tinead.....dis 60&10 %
Wood.....dis 25 %

Faucets.
Cork Lined, Wood.....dis 60&10 %
Fenn's.....dis 50 %
" Cork Stops.....dis 40 %
Star.....dis 55&10 %
Frary's Patent Petroleum.....dis 15&10 %
Taylor's Pattern " .....dis 20&10 %
Wood and Metallic.....dis 40 %

Feiloe Plates......₱ ℔ 14c; dis 10 %

Files.
American File Co.....$5 00 to £ currency—dis 10 %
Nicholson.....$5 00 to £ currency—dis 12½ %
Hartford File Co.....$5 50 to £ currency—dis 10 %
Newbould's.....5 25 to £ gold
Rothery's.....$5 to £ currency
J. & Riley Carr's Files and Rasps.....5 50 to £ gold
Stubs'.....8 50 @ 9 00 to £ gold
Butcher's.....5 50 to £ gold
Walter Spencer & Co.'s "Diamond".....5 25 to £ gold
Spear & Jackson's.....5 00 to £ gold
Hargreaves, Smith & Co.'s.....5 00 to £ gold
Jowitt's.....5 25 to £ gold
"Western".....5 00 to £ net
W. K. & C. Peace's "Imperial".....5 25 to £ gold
R. Ibbotson.....5 00 to £ gold
Beam & Murray, "Cyclops".....4 85 to £ gold
Fisher's.....4 75 to £ gold
Goodlad's.....4 00 to £ gold
Moss & Gamble.....5 25 @ 5 50 to £ gold
Thos. Turner & Co. (Peter A. Fraase & Co.).....5 00 to £ gold
" " Horse Rasps.....5 50 to £ gold
"Philo Sheffield," P. T. Co.....5 00 to £ gold

Floral Tools......dis 25 %

Fluting Machines.
Mrs. Coles, 7 inch rolls.....6 50
" " 5 " 5 50
Knox, with 4-inch Rolls.....5 00 each dis 12½ %
" " 6 " .....6 00 each dis 12½ %
O. K.....6 50 each net
Peerless, 4-inch Rolls.....4 00 each net
" 5 " .....4 75 each net
Excelsior, No. 1.....4 75 each net
" No. 2.....6 50 each net
Diamond.....7 50 each net
Climax 7-inch Rolls.....8 00 each net
" 4½ " .....6 50 each net
Empire.....4 00 each net
Eureka. No. 1, 7-inch Roll.....8 00 each net
" No. 2, 5-inch Roll.....6 00 each net
E. F. M., 4½-inch Roll.....5 50 each dis 15 %
" 6-inch Roll.....6 00 each dis 15 %
Myers Fashion Fluter, 4½ inch Rolls.....3 00 each net
" Convex Brass Fluter, Sad Iron attachment.....$1·75
Domestic Fluter.....$1·75 each net
Fairy, Self-Heater.....8 00 each net
Geneva Hand Fluter.....$15 00 per doz net
Champion, 6 inch rolls.....$6 00 each dis 10 %
" 4 inch rolls.....$5 00 each dis 10 %

Fluting Scissors......dis 20&10 %

Forges.
Keystone Portable Forge Co.'s.....dis 20 %
"Empire" (W. P. Kellogg & Co.).....dis 20 %

Forks.
Hay, Manure & Spading.....dis 20 %
Plated A 1.....dis 40, 10&5 %

Freezers.
Champion.....dis 33⅓
Torrey's.....dis 50 %

Fry Pans.—P. S. & W.
Tinned.....dis 20 %

₱ doz.	$3·00	3·25	3·62	4·00	4·50	5·00	5·50	6·00	7·50
No.	0	1	2	3	4	5	6	7	8

Smith, Burns & Co., "Excelsior" Polished.....dis 35 %

₱ doz	$2·70	4·00	4·70	5·20	6·00	7·00	8·00	9·00
No.	1	2	3	4	5	6	7	8

Gas Stoves.
Tift & Howard.....dis 20 %

Gauges.
Marking.....dis 45&10 %
Wire.....dis 10 %

Gimlets.
Metal and Wood Head.....dis 25&10 %

Grind Stones.
J. F. Green & Bro.....dis 20 %

Grind Stone Fixtures.....dis 50&10 %

Hammers.
Emmet Hammer Co.....dis 25 %
Humason & Beckley Mfg. Co.....dis 16⅔&10 %
Maydole's, new list.....dis 5 %
Cheney's.....new list net
Verree.....dis 5 %
Yerks & Plumb.....dis 12½ %
Minot & Co.....dis 15 %
Magnetic Tack.....dis 20&10 %
Warner's.....list net

Hand Cuffs and Leg Irons.
Tower's.....dis 25 %

Handles.
Wrought Chest.....dis 60&10 %
Flush Chest.....dis 60&10 %
Lifting.....dis 60&10 %
Coffin.....dis 50&10 %
Saw and Plane.....dis 20&10 %
Hammer and Hatchet.....dis 10 %
Greensboro', Axe, Pick, Hammer, &c.....dis 10 %
Woolworth Axe, Pick and Sledge.....dis 10 %
Brad Awl.....per gross $3 50—dis 20&10 %
Hickory Firmer Chisel, ass'td " 5 25—dis 10&10 %
" " " large " 6 25—dis 10&10 %
Apple " " ass'td " 6 00—dis 10&10 %
" " " large " 7 00—dis 10&10 %
Socket " " ass'td " 3 50—dis 10&10 %
" Framing " " 6 00—dis 10&10 %
File " " " 3 50—dis 10&10 %
Auger " " " 5 50—dis 10&10 %
" large " 6 50—dis 10&10 %

Hangers.
Barn Door.....dis 65&10 %
" Anti-Friction" (Rider, Wooster & Co.).....dis 30 %
Novelty.....dis 30 %

Harness Snaps.
Henshaw's.....dis 25&10 %
Judd's.....dis 40 %
Fitch's.....dis 30 %
Hotchkiss'.....dis 10 %
Andrews'.....dis 25 %
Sargent's.....new list dis 50&10 %
New York Wire.....dis 20&20 %

Hatchets.—Isaiah Blood.....dis 10 %

Shingling, Nos. 1 2 3	₱ doz	$7 50	8 00	8 50	
Claw, " 1 2 3	₱ doz	8 50	9 00	9 50	
Lathing, " 1 2 3	₱ doz	7 50	8 00	8 50	
Hunt's					dis 10 %
Shingling, Nos. 1 2 3	₱ doz	$7 25	8 00	8 25	
Claw, " 1 2 3	₱ doz	7 75	8 50	9 25	
Lathing, " 1 2 3	₱ doz	7 50	8 25	9 00	
Hurd's					dis 50 %
Shingling, Nos. 1 2 3	₱ doz	$8 00	8 50	9 00	
Claw, " 1 2 3	₱ doz	9 00	9 50	10 00	
Lathing, " 1 2 3	₱ doz	8 00	8 50	9 00	
Newark's Edge Tool Co.'s					dis 25 %
Shingling, Nos. 1 2 3	₱ doz	$6 50	7 00	7 50	
Claw, " 1 2 3	₱ doz	7 25	7 75	8 25	
Lathing, " 1 2 3	₱ doz	6 50	7 00	7 50	
Yerkes & Plumb					dis 12½ %
Shingling, Nos. 1 2 3	₱ doz	$7 00	7 50	8 00	
Claw, " 1 2 3	₱ doz	7 50	8 00	8 50	
Lathing, " 1 2 3	₱ doz	7 00	7 50	8 00	
Simmon's					dis 15 %
Shingling, Nos. 0 1 2 3	₱ doz	$7 50	8 00	8 50	9 00
Claw, " 1 2 3	₱ doz		9 00	9 50	10 00
Lathing, " 1 2 3	₱ doz		8 00	8 50	9 00
Broad, " 1 2 3	₱ doz		9 00	10 00	12 00
" " 4 5 6	₱ doz		14 00	16 00	18 00
" " 7 8	₱ doz		20 00	22 00	

Elephant						dis 25 %
Shingling, Nos. 1 2 3	₱ doz	$8 00	8 50	9 00		
Claw, " 1 2 3	₱ doz	9 00	9 50	10 00		
Lathing, " 1 2 3	₱ doz	8 00	8 50	9 00		
J. P. Verree & Co.						dis 5 %
Shingling, Nos. 1 2 3	₱ doz	$7 00	7 50	8 00		
Claw, " 1 2 3	₱ doz	7 50	8 00	8 50		
Lathing, " 1 2 3	₱ doz	7 00	7 50	8 00		
Underhill's						dis 10 %
Shingling, Nos. 1 2 3	₱ doz	7 25	8 00	8 75		
Claw, " 1 2 3	₱ doz	8 50	9 00	9 50		
Lathing, " 1 2 3	₱ doz	12 00	11 00	13 00		
Hinges.						
Gate, Western	₱ doz	$6·25—dis 60&10 %				
" N. E.	₱ doz	11·25—dis 6,&10&10 %				
" N. Y. State	₱ doz	7·20—dis 60&10 %				
Rolled Plate						dis 75 %
" Raised						dis 75 %
Wrought Strap and T						dis 35 %
Providence Plate.	6 and 8 in. list 11c.	over 8 in. list 9½c.				dis 25&10 %
Screw Hook and Strap	8, 10, 12 in. 7¼c	14 to 36 in. 5¾c				net
Heavy Welded Hook	8 to 12 in., 9c	14 in & up, 8¼c				dis 10 %
Screw Hook and Eye	⅜ to 1 in., 9¼c	⅜ in. 10¼c	⅜ in. 12¾c			net

Hoes.
Solid Shank, C. S.....₱ doz $8 00—dis 30 %
Socket.....₱ doz 9 00—dis 30 %
Riveted Eye.....₱ doz 5 00—dis 30 %
Grub.....dis 20 %
Planters'—Winsted.....add 10 %
Scovill.....add 33⅓ %
Scovill Pattern (Winsted).....add 20 %

Hooks.
Harness.....dis 60, 10&5 %
Bird Cage.....dis 70&10 %
Cotton.....dis 50 %
Belt.....dis 50&10 %
Clothes Line.....dis 60&10&10 %
Bench—Skinner's.....per doz $8 00, dis 30&10 %
Bench—Hotchkiss' $5 00 ₱ doz.....dis 10 %
Bench—Weston's No. 1, $8·00; No. 2, $7·00 per doz net
" —McGill's.....$8 00 per doz, dis 10 %
Wardrobe, Japanned.....new list dis 60, 10&10 %
Hat and Coat " .....new list dis 60, 10&10 %
Tough Staples and Hooks and Staples.....dis 70&10 %
Screw Hooks and Eyes, revised list.....dis 70, 10&10 %
Grass.....dis 20 %
Whiffletree—Patent.....dis 30 %
Hooks and Eyes—Malleable Iron.....dis 55 %
" " Brass.....dis 55 %

Horse Nails.
Putnam's.

No.	5	6	7	8	9	10
	32c	28c	26c	25c	24c	23c

In lots 2000 lbs. dis. 5 %.
Ausable Horse Nail Co.

No.	5	6	7	8	9	10
Ausable	30c	27c	25c	24c	23c	22c
Pointed and Polished	31c	28c	26c	25c	24c	23c
Pointed and Blued	32c	29c	27c	26c	25c	24c

In lots of 1000 lbs., 5% discount.
Brundage.

No.	5	6	7	8	9	10
	29c	26c	24c	23c	22c	21c

In lots of 500 lbs., dis. 5 %.
American Pressed.

No.	5	6	7	8	9	10
	32c	30c	30c	30c	30c	30c

In lots of 1000 lbs. dis 5 %.
Perkins Finished (ready to drive).

No.	5	6	7	8	9	10
	31c	28c	26c	25c	24c	23c

In lots of 1000 lbs. dis 5 %.
Buffalo Forged.

No.	6	7	8	9	10
	28c	26c	25c	24c	23c

Globe (Pointed and Polished).

No.	5	6	7	8	9	10
	31c	28c	26c	25c	24c	23c

In lots of 1000 lbs., 5 % discount.
National (Pointed and Polished).

No.	5	6	7	8	9	10
Patent Finish	28	25	23	22	21	20
Extra "	30	27	25	24	23	22

In lots of 1000 lbs., dis 5 %.
Vulcan (Blued, pointed, ready to drive).

No.	5	6	7	8	9	10
	33c	30c	28c	27c	26c	25c

In lots of 500 lbs., 5 % discount.
" 1000 lbs 7½ % discount.
New London Horse Nails.

No.	5	6	7	8	9	10
Great Western	31c	28c	26c	24c	23c	22c
U B	29c	27c	26c	25c	24c	23c

In lots of 1000 lbs., dis 5 %.

Star Brand.....₱ ℔ 16c
Morgan.....14c

Horse Shoes.
Burden.....₱ keg, $5 85
R. I. Horse Shoe Co., Perkins Pattern.....₱ keg, 5 85
" " " R. I. Pattern.....₱ keg, 6 35
Mule Shoes.....₱ keg, 6 85

Ice Picks.
Iron.....₱ gross $12 00 @ $16 00 net
White's.....per doz $2 50 dis 10 %
W. H.....per doz 1 00 dis 10 %
Dunlap's.....per doz 3 00 net

Kettles.
Brass.....₱ ℔ 55c net
In lots of 500 lbs.....₱ ℔ 50c net

Knives.
Ames' Butcher Knives.....dis 20 %
" Shoe " .....dis 15 %
" Bread " .....₱ doz $1·50—dis 15 %
Hay and Straw, "Wadsworth's".....dis 20 %
Lothrop's Cocoa Handle Lap Bolster Butcher Knives.....dis 25 %

Knobs.
Carriage.....dis 60&10 %
Base—Common.....net
" Plush Tip.....dis 10 %
" Elastic End.....reduced list dis 10&10 %

Ladles.
Melting.....dis 20 %

Lanterns.
Peerless.....dis 10 %
Brady's Patent.....dis 10 %
Etna.....dis 10 %
Yankee.....dis 10 %
De Beque.....dis 10 %

Lemon Squeezers.
Porcelain Lined.....per doz $7 00, dis 10 %

Lines.
Linen Fish.....dis 10&10 %
Cotton Chalk.....dis 40 %
Silver Lake Chalk.....dis 10&10 %
Mason's.....dis 10&10 %
Galvanized Wire Clothes.....$1 per 100 ft. dis 30 %

Locks and Latches.
Cabinet—Eagle.....dis 25 %
Cabinet—Gaylord.....dis 25 %
Langstroth & Crane.....dis 40 %
Trunk.....dis 15 %
Continental.....dis 15 %
Shepardson's.....dis 20 %
Romer's Padlocks.....dis 15 %
Scandinavian Jail.....dis 10 %
American Lock Co.....dis 33⅓ %
Plate.....dis 25 %
Pad.....new list dis 50, and 2 % for cash
Barnes & Deitz.....dis 25 %
Yale Lock Co.....dis 40 %
Sargent & Greenleaf.....dis 20 %
Trenton
Branford.
Norwich.
Russell & Erwin.
Norwalk.
Nashua.
Mallory, Wheeler & Co.
P. & F. Corbin.
Parker & Whipple.
Jacobus & Nimick Mfg. Co.
} New list dis 45 %. 2 % extra for cash.

Mallets.
Hickory and Lignumvitæ.....dis 20 %

Meat Cutters.
Dixon's (P. S. & W.).....dis 10 %

No.	1	2	3	4
₱ doz.	$14 00	$17 00	$19 00	$30 00

Hales'.....dis 25 %

No.	11	12	13
₱ doz.	$27 00	$33 00	$42 00

Miles Challenge.....dis 20 %

No.	1	2	3
₱ doz.	$22·00	$30·00	$40 00

Perry's Champion (P. S. & W.).....dis 10 %

No.	200	300	400
₱ doz.	$22 00	$27 00	$40 00

Woodruff's (P. S. & W.).....dis 10 %

No.	100	150
₱ doz.	$15 00	$18 00

American.....dis 25 @ 25&5 %

No.	1	2	2½	3	4	B	5
Each	$6·00	$9·00	$12·00	$15·00	$30·00	$60·00	$75·00

Molasses Gates.
Stebbins'.....dis 65&10 %
Tinned ends.....dis 40&10 %
Patent Self-Measuring.....per doz $42 00—dis 20&10 %
Bush's.....dis 20 %
Lincoln's.....dis 50&10 %

Mortars and Pestles.
Iron.....net

Mouse Traps.
Wood Choker.....₱ doz holes, 16 @ 18c
Round, Wire.....₱ doz $1 40 to 2 00 net
Square, " .....₱ doz 2 00 to 2 50 net
Cage, " .....₱ doz 2 50, dis 10 %

Mowers, Lawn.
Excelsior.....dis 25 %

Nails......See Trade Report

Nail Pullers.
Capewell's Giant.....per doz $30 00 net

Nuts and Washers.
Nuts.....large, 6c; small, 8c off list.
Washers.....large, 8c; small, 10c off list.

Oil Stones.
Washita No. 1.....₱ ℔ 22c
" Ita Slips.....₱ ℔ 45c
Washita No. 2.....₱ ℔ 11c
Arkansas.....₱ ℔ 1 25
Hindostan.....₱ ℔ 8c dis 10&10 %
" Slips.....₱ ℔ 10c dis 10&10 %

Oilers.
Miller's Zinc.....dis 30 %
" Brass and Copper.....dis 25 %
Olmsted's.....new list dis 25&10 %
Broughton's.....dis 25&5 %
Malleable.....per doz $5 00 dis 10 %
Common Tin.....dis 30&10 %
" Zinc.....dis 30&10 %
" Brass and Copper.....dis 30&10 %
Prior's.....dis 30&10 %

Ox Shoes.
Concave.....₱ ℔ 13c net

Ox Balls......dis 60&10 %

Pencils
Rope's Carpenters'.....dis 30&10 %
Dixon's Lead.....₱ gross $4·50 net
" Lumber.....₱ gross 9·00 net

Picture Nails and Knobs.
Brass Head.....dis 60&10 %
Richards' Patent.....dis 40 @ 40&10 %
Judd's.....dis 60&10 %

Pinking Irons......per doz $2 75—dis 65 %

Planes.
Auburn Tool Co.'s.....dis 30&10 %
Ensenore, Bench.....dis 50 %
Chapin's, 1st quality.....dis 25&10 %
Chapin's 2d quality.....dis 33⅓&10 %
Greenfield Tool Co.....dis 25&10 %
" New York".....dis 40 %
Sandusky Tool Co., 1st quality.....dis 35 %
" " 2d " (Ogontz).....dis 35 %

Galvanized Telegraph. Nos. 10 and 11...₩ ℔ 10½c @ 11½c
" " " 12.....₩ ℔ 10½c @ 11½c
Annealed Fence. Nos. 8 and 9.....dis 40 @ 45 %
" Grape, " 10 to 14.....dis 40 @ 45 %
Fence Staples.....₩ ℔ 8 @ 8½ %
Stubs' Steel Wire.....$7 00 to £ gold
Judd's Picture Wire.....dis 50 %

Wrenches.

American Adjustable.....dis 45 %
Baxter's Adjustable "S".....dis 20 %
" Diagonal.....dis 20 %
Collins & Co.'s.....dis 45 %
Coes' Genuine.....dis 40&5 %
" Pattern (Wrought).....dis 50 %
" " (Malleable).....dis 60&10 %
Lindsay's Patent.....dis 25 %
Taft's Pattern.....dis 70 %
Davis' Patent Duplex.....new list dis 25 %
Bemis & Call's Patent Combination.....dis 20&5 %

Wringers.

Providence.....₩ doz $54 00
Providence "Reliance".....₩ doz 53 00
Universal—Extra.....₩ doz 58 00
Novelty.....₩ doz 58 00
Sherman.....₩ doz 58 00
Reliance.....₩ doz 58 00
Monitor.....₩ doz 58 00
King.....℔ doz 58 00
Crown.....₩ doz 58 00
Eureka.....₩ doz 58 00
Independent.....₩ doz 58 00

TIN WARE AND TRIMMINGS.

STAMPED TIN WARE, dis 5 @ 10 %.

COMMON STAMPED WARE, &C.

Bucket Covers.

	1	2	3	4
Quarts	4¼	5 5-16	6 5-16	6¾	7 11-16
Inch	4¾				
Per gross	$2·00	2·60	3·40	4·25	5·75
Quarts	6	8	10	12	
Inch	8¾	9¼	9½		10 9-16
Per gross	$7·00	8·00	8·50		11·50

Cake Box Covers.

	Small.	Medium.	Large.
Inch	11¾	12¾	13¾
Per gross	$15·00	18·00	21·00

Pot Covers.

Inch	7¾	8¼	8¾	9¼	9¾	10¼
Per gross	$5·75	6·00	6·25	6·75	7·25	8·25
Inch	10¾	11¾	11¾	12¾	12¾	13¼
Per gross	$8·75	9·50	10·00	13·00	13·75	16·50

Pie, Dinner or Scolloped Plates.

Inch	6	7	8	9	10	11
Per gross	$4·00	5·00	6·00	6·50	8·50	10·50

Deep Pie Plates.

Inch	9	10
Per gross	$8·50	10·50

Jelly Cake Pans.

Inch	9	10
Per gross	$7·50	10·00

Coffee Pot Covers.

Plain	1¾	2	3	4	5	6 qts.
Inch	3	3½	3¾	4½	5	
Per gross	$1·15	1·40	1·60	2·00	2·75	3·00
Rimmed	3¾	3	3½	4	4½	inches.
Per gross	$2·25	2·50	3·00	3·50	4·00	

T. K. Breasts only.

Inch	7¾	8	8½	9	9½	10	10½	11	11½
Per gro.	$6·00	6·50	6·75	7·25	7·75	9·50	10·00	12·00	13·00

Grater Plates.

Sheet	¼	1
Per gross	$5·00	6·00	11·50

Scolloped Cake Pans.

	Small.	Large.
Without Tubes	per gross, $8·00	11·50
With Tubes	" 10·50	14·00

Stamped Square Pans.

No.	½	1
Per gross	$7·50	14·50

Common Square Pans (One Sheet).

Per gross	$12·50

Milk Skimmers (Plain or Pierced).

Per gross	$4·00

Lettered Plates.

Inch	5½	6
Per gross	$3·25	4·00

Steamer Bottoms.

Add $1 per gross, or 10c. per doz. to list of Pot Covers.

Tin Stove Pipe Rings.

Inch	4	4½	5	5½	6	7
Plain	per gro. $4·50	5·00	5·50	6·00	6·50	7·50
Jap'd or Burn'd	" 6·00	6·50	7·00	8·00	9·50	10·00

Coffee Boiler Lips.

	Small.	Large.
To Rivet	per gross, $0·80	1·10
To Solder	" 1·25	

Plain Stamped Water Dippers.

	½ pint.	Pint.	Quart.	2 quarts.	2½ quarts.
Per doz	·90	1·15	1·50	1·85	2·50

RETINNNED WARE, dis 30 @ 25 %.

Retinned Milk Pans.

Qts	½	1	1½	2	3	4	5	6	8	10	12
₩ doz.	1·20	1·50	1·75	2·00	2·25	2·75	3·15	3·50	3·85	4·75	5·25	5·75

Dipper Bowls, Plain Stamped.....dis 30 @ 25 %

Pints	½	1	Quarts	1	2	2½
Per doz.	·50	·75	Per doz.	1·00	1·25	1·75

Dipper Bowls, Retinned.....dis 30 @ 25 %

Pints	½	1	Quarts	1	2	2½
Per doz.	·75	·90	Per doz.	1·40	1·75	2·25

Pans.

Dish Pans, Tinned.....dis 30 @ 25 %

Quarts	7	8	10	14	17	21	30
Per doz.	8·50	9·50	11·00	13·00	16·00	19·00	30·00

JAPANNED TIN WARE.

Canisters, Common.....dis 10 %

Pound	½	1	2	3
Per doz	$1·10	1·60	2·50	3·25

Canisters, Hinged.....dis 10 %

Pound	1	2	3
Per doz	$1·75	2·75	3·40	3·75	4·50

Candlesticks, Japanned.....dis 10 %

No	1	2
Per gross	$6·00	7·00

Cake Boxes, Round.....per nest, $3·25, dis 10 %
Sugar.....per nest, 4·25, dis 10 %
Chamber Pails, Japanned (Smith, Burns & Co.)...dis 10 %

Nos.	2	3	4	5
Green, per doz.	$8·00	9·00	10·50	12·50
Oak	$9·50	10·50	12·00	13·50

Dust Pans, Corrugated.....per gross, $22·00, dis 10 %
Box Graters.....per gross, $4·00, dis 10 %
Molasses Cups.....dis 10 %

Pint	½	1	2
Per doz	$1·25	·50	2·75

Lunch Boxes, per doz.....1 in $2·00; 8 in. $2 50; dis 10 %
Pepper Boxes Japanned.....dis 10 %
Per gross.....Small, $8·00; Large, $4·00
Toy Banks, House.....dis 0 %
Tea Trays, American Tea Tray Co.....dis 15 %

No	1	2
Per gross	$7·00	5·50

Toy Banks Gothic.....dis 10 %

No	1
Per gross	$5·50

Toy Cups, Straight.....dis 10 %

No	1	2	3
Per gross	$4·00	3·50	3·50

Toy Cups, Fluring...No. 1, $4·25; 2, $3·70 ₩ gross, dis 10 %
Toy Pails, Covered.....dis 10 %

No	1
Per gross	$4·50

Toy Rattles.....per gross, $2·25, dis 10 %
Trunks, Wire Handled.....per nest (5) $1·50, dis 10 %
Spittoons, Tin....per gross, No. 2, $30, No. 3, $27, dis 10 %

PLANISHED TIN WARE.

Planished Coffee Pots, Round.....dis 25 @ 30 %

Each	·60	·70	·85	1·05	1·25	1·30	1·40
Pints	1	2	3	4	5	6	7	8

Planished Tea Pots, Round.....dis 25 @ 30 %

Each	·70	·80	·95	1·05	1·25
Pints	2	3	4	5	6

Planished Tea Pots, Oval.....dis 25 @ 30 %

Each	·70	·80	·90	1·05	1·15	1·40	1·75
Pints	2	3	4	5	6	8	

Planished Pepper Boxes, No. 1.....per doz., $1·32
Planished Flour Dredges, No. 3, $2·10; 4, $2·45 ₩ dozen.
Planished Round Coffee Biggins.....dis 25 %

Pints	2	3	4	5	6	8
Each	$1·00	1·10	1·20	1·40	1·60	2·00

Planished Oval Coffee Biggins.....dis 25 %

Pints	3	3	4	5	6	8
Each	$1·15	1·25	1·40	1·60	1·80	2·25

Planished Oval Chafing Dishes, Imperial Covers..dis 25 %

Inch	10	12	14	16	18	20	22	24
Each	$3·85	5·00	6·25	7·60	9·00	11·50	15·00	16·50

Planished Oval Chafing Dishes, Low Covers.....dis 25 %

Inch	10	13	14	16	18	20
Each	$3·25	4·25	5·20	6·20	7·90	9·25

Planished Low Dish Covers.....dis 25 %

Inch	10	11	12	14	16	18	20
Each	$ ·70	·80	1·00	1·25	1·50	2·00	2·75

Planished Imperial Dish Covers.....dis 25 %

Inch	10	11	12	13	14	16	18	20	22	24
Each	$1·55	1·70	2·00	2·60	3·15	3·45	4·60	5·45	6·30	

Planished Etna, on Stands.....dis 25 %

Pints	1½	2	3	4	5
Each	$0·90	1·00	1·20	1·50	1·75

Planished Liquor Mixers.....dis 25 %

Nos.	0	1	2
Per doz.	$2·00	2·10	2·45

Planished Oval Melon Molds.....dis 25 %

Nos.	2	3	4	5	6	7	8	9
Each	$0·60	·65	·70	·80	·90	1·00	1·15	1·25

Planished Oval Tumbler Warmers.....dis 25 %
To fit 1, 2, 3, and 4 O. G. Urns.....each, $2·50
Planished Oval O. G. Urns.....dis 25

Nos.	0	1	2	3	4	5	6	7	8
Each	$4·90	5·45	6·30	7·00	7·75	9·25	11·25	13·50	15·50

Planished Round Urns.....dis 25 %

Nos.	0	1	2	3	4	5	6	7
Each	$4·20	4·85	5·45	6·30	7·25	9·00	11·00	14·25

Planished Round Oyster Dishes, (Complete).....dis 25 %

Nos.	2
Each	$2·10

Planished Oyster Dish Plates.....dis 25 %

Nos.	1	2
Each	$0·25	0·30

Oyster Dish Covers.....dis 25 %

No.	1	2
Each	$0·30	0·35

Tea Pot Handles—P. S. & W.....dis 30 %

Stow's Patent Hollow Tea Pot Handles.

No. 1, Small 4½ inches.....per gross, $11·50
No. 2, Medium, 5¾ " " 12·50
No. 3, Large, 6½ " " 13·50
No. 4, Ex. Large, 7¼ in., for Wash Pitchers &c. " 18·00

Stow's Patent. New Pattern.

No. 25, Small, 4½ inches.....per gross, $11·50
No. 35, Medium, 5¾ " " 12·00
No. 45, Large, 6½ " " 13·00

Solid iron. Tin Tipped.

No. 10, Small, 4¾ inches.....per gross, $9·00
No. 15, Medium, 5½ " " 9·50
No. 20, Large, 6¼ " " 10·75

Stow's Patent Hollow Tea Pot Handles, Adamantine Bronze—P. S. & W.

No. 12, Bronzed and Tin-Tipped.....per gross, $18·50
American Handles. Or Best Malleable Iron.
P. S. & W.....dis 30 %

Japanned.

No. 1, 5¼ inches long	per gross,	$3·50
No. 2, 6 "	"	3·75
No. 3, 6½ "	"	4·00
No. 4, 7¼ "	"	4·25
No. 5, 8 "	"	4·50
No. 6, 9 "	"	4·75

Tinned.

No. 1, 5¼ inches long	per gross,	$4·25
No. 2, 6 "	"	4·50
No. 3, 6½ "	"	4·75
No. 4, 7¼ "	"	5·25
No. 5, 8 "	"	5·50
No. 6, 9 "	"	5·75
Japanned	per lb.,	·16
Tinned	"	·20

Iron Kettle Ears (P., S. & W.).....dis 45 %
Half gross pairs in a package.

Tinned.

Nos.	1	2	3	4	5	6	7	8
Per gross pairs	.88c	$1·00	1·50	1·75	2·10	2·75	3·50	4·75

Black.

Nos.	1	2	3	4	5	6	7	8
Per gross pairs	.75c	.88c	$1·35	1·50	1·75	2·25	2·75	4·00

Tinned Tea Kettle.

Nos.	4	5	6
Per gross pairs	$1·75	2·10	2·75

Extra Heavy Tinned Kettle Ears—French Pattern.

Nos.	1	2	3	4	5	6	7
Per gross pairs	$1·00	1·25	1·50	1·75	2·25	2·75	3·50

Malleable Iron Kettle Ears for Coal Hods, &c.
P., S. & W.....dis 20 %

No. 10 Small	₩ ℔,	Tinned, 20c;	Black, 16c
No. 20 Medium	₩ ℔,	" 20c;	" 16c
No. 30 Large	₩ ℔,	" 20c;	" 16c
No. 40 Extra Large	₩ ℔,	" 20c;	" 16c

In cases of 100 lbs. each.

Milk Can or Boiler Handles—(P. S. & W.) 4½ in..dis 25
Plain, 8c.; Japn'd, 9c.; Tinned, 16c. per lb.; Malleable Clips or Ears to match, Tinned.....28c per lb.
Toilet Ware Handles—4½ inches (P. S. & W.).....dis 35 %
Plain with drilled holes, per lb.....9c
Plain with Cast " " 8c
Plumbers' Scrapers—(P. S. & W).....dis 25 %
Extra quality, length 6 in., per doz.....$4·00

METALS.

IRON.—DUTY Bars, 1 to 1¼ cents per lb., Sheet, Band, Hoop and Scroll, 1¼ to 1¾ cents per lb. Provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 per ton; Polished Sheets, 2 cents per lb.; Wrought Scrap, $8 per ton; Cast Scrap, $6 per ton. All subject to a reduction of 10 per cent. Railroad, 70 cents per 100 lbs. Boiler and Plate, 1½ cents per lb

Pig Iron—AMERICAN.

Foundry No. 1	₩ ton,	$29 00 @ 30 00
Foundry No. 2	"	27 50 @ 28 50
Gray Forge	"	23 00 @ 27 00
White and Mottled	"	

SCOTCH.

Coltness	"	
Glengarnock	"	39 00 @ 40 00
Eglinton	"	37 00
Summerlee	"	

Bar Iron.

Am. Renned, at mill.....₩ ℔ 3c

Rails.

Welsh, gold	₩ ton,	48 00 @ 50 00
American, at works, currency	"	@ 35 00
Old Rails, currency	"	32 00

Scrap.

Wrought Scrap.....

Bar Iron from Store.

Common Iron.

⅜ to 2 in. round and square	₩ ton,	$ 65 00
⅝x9-16 in " "	"	70 00
¾ in. " "	"	72 50
2½ to 3 in. "	"	70 00
1 to 6 in. wide x ⅜ and 1 in thick	"	65 00
1¼ to 6 in wide x ¼ & 5-16 in. thick	"	70 00
1 and 1¼ in. x ½ and 5-16	"	72 50

Swedish Iron.

1½x⅛ to ⅝	"	140 00
1¾ to 5x⅜ to ⅞ and ⅛ to 1½ in. square	"	135 00
6 to 7x⅜ and ½	"	145 00

Rennea ron.

⅜ to 2 in. round and square	"	67 50
1 to 6 in. wide x ⅜ to 1 thick	"	67 50
1¼ to 6 in. wide x ¼ and 5-16 thick	"	72 50
1 and 1¼ x ¼ and 5-16	"	72 50

Large Rounds.

2¾ to 2¾ round and square	"	77 50
3, 3¼ and 3½ in.	"	82 50
3¾ and 4 in.	"	90 00
Rods—⅜ and 11-16, round and square	"	70 00
½ and 9-16, " "	"	72 50
7-16, " "	"	80 00
⅝, " "	"	85 00
5-16, " "	"	90 00
¾, " "	"	95 00
5-16, " "	"	127 50

Sheet Iron.

	Common American and English.	R. G. American.	R. G. English.
Nos. 10 to 20	₩ ℔ 4½ @ 4¾c	5½c	5¾c
21 to 24	" 4¾ @ 5c	6c	6c
25 to 26	" 5 @ 5¼c	6c	6c
27	" 5¼ @ 5½c	6¼c	6¼c
28	" 5¾c	6¾c	6¾c

Galvanized, 1s to 23, prime, ₩ ℔ 10; 2d quality...₩ ℔ 8c

"	21 to 24	"	"	11	10c
"	25 to 26	"	"	12	11c
"	27	"	"	13	12c
"	28	"	"	14	13c

Patent Polished.....15 @
Russia, Nos. 8 to 26.....₩ ℔ 18c
" Stained, No. 1.....17c
Belgian.....12c

One piece Corrugated Sheet Iron Elbows.

CHARCOAL IRON

⅜	5	7	7	inch.
$4·50	3·50	4·50	5·25	6·50 per doz.

RUSSIA IRON.

5	5½	6	7 inch.
7·00	9·50	12·00	14·00 per doz.

BABBITT METAL.

Excelsior				cash, dis 10 %
No	1	2		Extra.
	10c	12c	15c	20c @ 25c

COPPER—DUTY: Pig, Bar and Ingot, 5c.; old copper 4 cents ₩ ℔; Manufactured (including all articles of which copper is a component of chief value) 45 % ad valorem. All subject to a reduction of 10 per cent.

American Ingot.....₩ ℔ 21½c
English " "

SHEATHING, BRAZIERS COPPER, BOLTS, &C.

Braziers Copper, ordinary sizes, over 16 oz., per square foot	33c ₩ ℔
Braziers' Copper, ordinary sizes, 16 oz. and over 12 oz., per square foot	35c. "
Braziers Copper, 12 oz. per square foot and lighter	39c. "
Circles less than 24 inch in diameter	35c ₩ ℔
Circles, 24 inch diameter and over	39c. "
Segment and Pattern Sheets	35c. "
Locomotive Fire Box Sheets	33c. "
Sheathing Copper, over 12 oz. per sq. ft.	31c. "
" 12 oz. ₩ sq. ft. and lighter	33c. "
Bolt Copper	33c. "
Copper Bottoms.33 @ 35c. ₩ ℔	net

No Copper is Sheathing except 14x48 inches, and not to exceed 34 oz. to the square foot.

O'NEILL'S PATENT PLANISHED COPPER.

14x48.

14 and 16 oz. and heavier	36c.	By the case, 35c. ₩ ℔
12 oz. and lighter	39c.	" " 38c. "

Boiler Sizes.

7 in., 14x52.	8 in., 14x56. 9 in., 14x60
14 and 16 oz. and heavier	.38c. By the case, 37c. ₩ ℔

(And all sizes not over 20 inches wide.)

30x60

14 and 16 oz. and heavier	40c. ₩ ℔
12 oz	43c. "

TINNING.

14x48, by the case	8c. ₩ sheet
14x48, less than case	10c. "
Boiler Sizes, 7 and 8 inch	12c. "
" 9 inch	15c. "
Other sizes not larger than 30x60	2½c. ₩ sq.
Larger than 30x60	5c. "

LEAD—DUTY Pig, $2 per 100 lbs.; old Lead, 1¼ cent per lb.; Pipe and Sheet, 2¼ cents per lb. All subject to a reduction of 10 per cent.

Spanish	6½ @ 6¾c gold
German Refined	6½ @ 6¾c gold
English	6½ @ 7c gold
American	6¾c gold
Bar	dis 10 % 8¼c.
Pipe	dis 10 % 8¾c.
Tin Lined Pipe	dis 10 % 16½c.
Sheet	dis 10 % 8¾c.
Shot	dis 10 %.Drop, 8¾c.; Buck. 9¼c.
Solder	No. 1. 18c; No. 2. 18½ @ 14c

STEEL—DUTY: Bars, Ingots, Sheets and Coils, valued at 7 cents per lb., or under, 2¾ cents; over 7 cents, and not above 11, 3 cents per lb.; over 11, 3¼ cents per lb. and 10 % ad val. Railway Bars 1¼ cents per lb. Railway Bars, in part Steel, 1 cent per lb. All subject to a reduction of 10 per cent. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as Steel.

American Cast Steel.

Tool	15 @ 16c
Spring	10c
Homogeneous	12½c
Tire	12½ @ 13½c
Machinery (round and square)	10 @ 11c
File	11c
Sheet	14 @ 16c
Saw Plate, mill and mulay	14 @ 16½c
Saw Plate, gang and X cut	13 @ 14c
" circular as to size	18 @ 30c

Chrome Steel.

Tool	₩ ℔ 20 @ 21c
Tool, extra fine	" 40 @ 75c
Spring	₩ ℔ 12c and upward
Machinery	₩ ℔ 14c.
Hammer	" 15c.
Gun or Homogeneous	" 16c

English Steel,—payable in gold, dis 5 % cash.

"	Best Cast	₩ ℔ 18c
"	Extra Cast	" 19c
"	Round Machinery, Cast	" 11½c
"	Swaged, Cast	" 18c
"	Best Double Shear	" 18c
"	Blister, 1st quality	" 13½c
"	" 2d quality	" 11½c
"	" 3d quality	" 10½c
German Steel, Best		" 11½c
do	2d quality	" 10½c
Sheet Cast Steel, 1st quality		" 18c
" "	2d quality	" 16c
" "	3d quality	" 14c
File Steel, Flat and ½ Round		" 12½c
"	Square and Round	" 13c
"	Mill	" 13½c
"	Taper to 4 inch	" 17c
"	Taper 3 and 3¼ inch	" 18c

SPELTER—DUTY: In Pigs, Bars and Plates, $1 50 per 100 lbs.—less 10 per cent.

Silesian, cash.....6¾ @ 7c, gold
American " .....6¾ @ 11c., currency

TIN—DUTY: Plates, Sheets, Tagger and Terne, 15 per cent. ad val.; Electro-galvanized Plates, 2 cents per ℔; Manufactures of, not enumerated, 35 per cent. ad val.—all subject to a reduction of 10 per cent. Bars, Block and Pigs, free. Banca, subject to duty of 10 per cent.

Banca.....₩ ℔ 26c., gold
Straits.....₩ ℔ 23c., gold
English.....₩ ℔ 21½ @ 23c., gold

CHARCOAL TIN PLATE.

I C 10x14, Prime Charcoal	11·00 to 11·25
12x12, "	11·75
14x20, "	12·00
I X 10x14, "	13·50
12x12, "	14·00
14x20, "	14·50
D C 12½x17 "	10·75
D X 12½x17 "	13·00
For each additional X add	2·25

COKE TIN PLATE.

	Best	2d Quality.	Ordinary.
I C 10x14	$10·50 @ 11·00	9·50 @ 10·00	9·00 @ 9·50
I C 12x12	11·00	10·50	
I C 14x20	11·25	10·50	

TERNE PLATE.

	Prime Char.	2d qual.	Coke.
I C 14x20	$10·00 @ 10·25	9·25 @ 9·75	7·75 @ 8·50
I X 14x20	12·50		
I C 20x28	20·00 @ 21·00	19·00 @ 19·75	16·50 @ 18·00
I X 20x28	26·00		
I C 20x200 ft.	24·00		

ZINC.—DUTY: Pig or Block, $1 50 per 100 lbs. Sheet 2¾c. ₩ ℔. All subject to a reduction of 10 per cent.

Sheet.....cask 9¾c
" .....open 10c

Paper Stock, Old Metals, &c.

(Dealers' Selling Prices.)

Canvas linen	6¼ @
" cotton. No. 1	6¾ @ 7
" " No. 2	@ 5
White linen rags, No. 1	6¾ @
" " No. 2	4½ @
Colored	2½ @
Mixed woolens	@ 2½
Soft woolens	@ 5½
Gunny bagging	1¾ @ 2
Jute Butts	2½ @ 2¾
Kentucky bagging	5¼ @ 5½
Book stock	4 @ 4½
Waste paper and scraps	1 @ 1½
Rope cuttings	1¾ @ 8
Kentucky Bale rope	4 @ 4½
Oakum junk, No. 1	5½ @ 5¾
No. 2	@ 4
Grass rope	3½ @ 3¾
Tarred Shaking	1½ @
White Collar Cuttings, all paper	@
" " " muslin lined	5 @
" Envelope "	@
Hard White Shavings, No. 1	6½ @
Soft " No. 1	@
White Shavings, No. 2	5½ @ 6
Mixed Shavings, part white	@ 4¾
Imperfections, No. 2, best folded sheets	@
" " 1, Heavy Stock	4¾ @ 5
Book Stock, Mixed	3½ @ 4
" " No. 2, light	@ 2¼
Prints	1½ @ 2
Pure Manilas	2
Bogus Manilas and Hardwares	1 @ 1¾
Commons	@
Binders' Board Cuttings	1½ @ 2
Straw Board Cuttings	1¼ @ 1⅜

Old Metal.

Copper	@ 19
Yellow metal	@ 15
Brass	@ 14
Heavy Composition	@ 18
Old lead, solid	@ 6¾
Tea lead	4½
Wrought iron	@ 1⅜
Sheet iron	@
Cast iron	@ 1¾
Machinery iron	@
Zinc	@
Pewter, No. 1	17
" No. 2	10 @ 12
Spelter	5½ @ 6

Paints, Oils, etc.

Paints.

Black, lamp—Coach Painters	₩ ℔ 20c
" " Ordinary	6c
" Ivory Drop, fair	15c
" " best	26c
Black Paint, in oil.....kegs, 8c.; asst'd cans, 11	c
Blue, Prussian, fair to best	50 @ 75c
" " in oil	35 @ 65c
" Chinese, dry	83c
" Ultamarine	25 @ 30c
Brown, Spanish	15c
" Van Dyke	9c
Carmine, 40	$12 00
Green, Chrome	15 @ 22c
" " in oil	18 @ 25c
" Paris	good, 30c; best, 40c
" " in oil	" 30c " 45c
Mineral Paints	1¼ @ 4c
Orange Mineral	14½c
Red Lead, American	9½c
" " English	10½c
" Venetian (N. C.) dry	2½c
" " in oil.....asst'd cans, 11c; kegs, 8½c	
" Indian, dry	10c
Rose Pink	13c
Sienna, American, Raw	4c
" Burnt	4½c
" " in oil	16 @ 20c
" Raw "	15 @ 25c
Umber, Burnt	4 @ 8c
" " in oil	16 @ 21c
" Raw	3½ @ 7½c
" " in oil	16 @ 22c
Vermillion, Chinese	₩ 2 30
" English	1 98
" Trieste	1 65
" American, Common	25c
White Lead, American, pure dry	10½c
" " in oil	11½c
White, Paris, English, prime.....in bbls. 2½ @ 2¾c	
Yellow Ochre, French	2½ @ 2¾c
" " in oil....asst'd cans, 11c; kegs, 8½c	
" Vermont.....in casks 1½c	
" Chrome	17 @ 21c
" " in oil	18 @ 22c
Zinc White, American No. 1 dry	9c
" " " 1, in oil	11c
" French (Paris)	11 c
" " in oil	12 c

Oils.

Linseed Raw	₩ gal. casks, 79c. bbls. 80c
" Boiled	" 81c. " 85c
Whale, Crude	"
" Bleached Winter	"
Sperm, Crude	" 1·85
" Winter unbleached	" 1·85
" Bleached	" 1·90
Seal, Extra Refined	"
Lard, Pure Winter	"
" Spring	" 1·00
Cotton Seed, Crude	" 60c
" Southern Yellow	" 65c
" White	"
Neatsfoot, Winter	70c @ $1·10
Natural Lubricating	38c @ 40c

Sundries.

Asphaltum	9c
Benzine	₩ gal. 16c
Chalk	1¾c
" Block	
Dryer, Patent, Am'n	ass't cans, 10½c.; kegs 9c
" " English	" 11c.; " 9c
Flocks	
Frostings	50c
Glue, White	33 @ 47c
" Sheet	20c
Glaziers' Points, Zinc	9c
Gum, Copal	55c
" Damar	25c
" Shellac, English	60c
" " dark	50c
Litnarge	10c
Pumice Stone, selected Lumps	4 @ 6c
" powdered	4c
Putty in bladders	3½c
" in bulk	3c
Rotton Stone, soft, English	8c
Spirits Turpentine	37c
Whiting, Spanish	1c

Glass.

French Window—1st, 2d, 3d, and 4th qualities. Per box of 50 feet.

SINGLE.

SIZES.	I.	II.	III.	
6 x 8 to 10 x 15	$10·25	$9·25	$8·75	$8·00
11 x 14 to 16 x 24	12·00	11·00	10·00	9·50
18 x 22 to 20 x 30	15·00	13·50	12·00	10·50
15 x 36 to 24 x 30	17·50	15·25	12·50	
26 x 28 to 24 x 36	18·25	16·00	13·25	
26 x 36 to 26 x 44	20·00	18·00	14·50	
26 x 46 to 30 x 50	21·00	19·00	15·25	
30 x 52 to 30 x 54	22·50	20·25	16·25	
30 x 56 to 34 x 56	24·50	21·75	19·00	
34 x 58 to 34 x 50	26·00	24·50	21·50	
35 x 60 to 40 x 60	30·50	27·00	24·50	

DOUBLE.

SIZES.	I.	II.	III.	IV.
6 x 8 to 10 x 15	$15·50	$15·00	$14·00	$13·00
11 x 14 to 16 x 24	19·25	17·75	16·00	15·25
18 x 22 to 20 x 30	24·00	21·75	19·25	
15 x 36 to 24 x 30	28·00	24·50	20·00	
26 x

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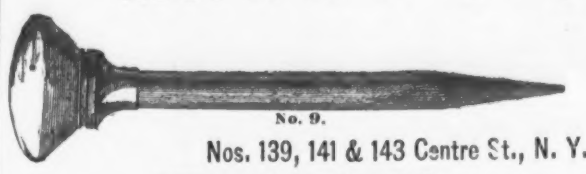
MARKT & CO.,



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SCREW WRENCHES.

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We invite the particular attention of the trade to our New Straight Bar Wrench, *widened*, full size of the larger part of the so called "reinforced or jog bar." Also our enlarged jaw, made with ribs on the inside, having a full bearing on the front of bar (see sectional view), making the jaw fully equal to *any* strain the bar may be subjected to.

These recent improvements in combination with the nut inside the ferrule firmly screwed up flush, against square, solid bearings (that cannot be forced out of place by use), verifies our claim that we are manufacturing the strongest Wrench in the market.

We would also call attention to the *fact*, that in 1869 we made several *important* improvements (secured by patents), on the old wrench previously manufactured by L. & A. G. Coes, which were *at once closely* imitated and sold as the *Genuine* Wrench by certain parties who seem to rely upon *our* improvements to keep up their reputation as manufacturers, and although the fact of their imitating our goods may be *good* evidence that we manufacture a superior Wrench, we wish the trade *may not be deceived* on the question of *originality*. Trusting the trade will fully appreciate our *recent* efforts, both in improvements on the Wrench and in the adoption of a Trade Mark, we would caution them against imitations. None genuine unless stamped

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Wrought Butts, Strap and T Hinges.
Bronzed Butts and Bolts.
Wrought Barrel, Square and Shutter Bolts.
Wrought Chest Handles, Washers, Flush Bolts, &c.

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Factory at New Britain CONNECTICUT.

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All our goods are manufactured from patent faced iron plates; they have a smooth face and bright finish.

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THOMAS JOWITT & SONS, (Sheffield, England,) Celebrated FILES AND HORSE RASPS. Rough and Ready and CLIPPER SCYTHES. Warranted.

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MANUFACTURERS, IMPORTERS AND DEALERS IN

Hardware and Upholsterers' Brass Goods.

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Small Brass and Iron Castings made to order.

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BUTCHERS' KNIVES,
BUTCHERS' STEELS,
AND
SHOE KNIVES.

THE TRADE MARK, IN ADDITION TO THE NAME, IS STAMPED UPON EVERY ARTICLE MANUFACTURED BY

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Buyers are specially cautioned against IMITATIONS of the MARK, and the SUBSTITUTION of COUNTERFEITS bearing the NAME, "WILSON," only.

Granted A.D. 1766, by the Corporation of Cutlers of Sheffield, and protected by Act of Parliament.

Works:—SYCAMORE STREET, SHEFFIELD. ESTABLISHED in the Year 1750.

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IMPORTERS OF

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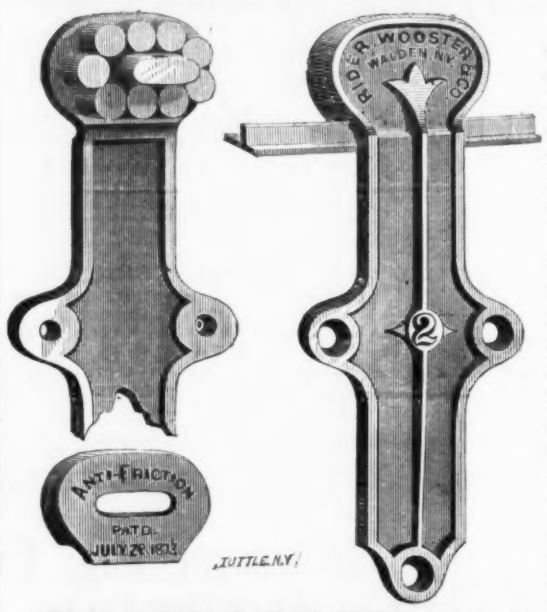
Wostenholm's IXL Pocket Knives & Razors, Butcher's Files, Tools, &c.

No. 93 Chambers Street, NEW YORK.

Anti-Friction Barn Door Hanger



This Hanger is entirely new in principle and design, and possesses marked advantages over all others, entirely obviating all the defects and annoyances hitherto experienced in the use of ordinary sheaved hangers.

In construction it is exceedingly simple, as will be seen by the cut. The weight of the door is supported by a strong stud, between which and the rail is a series of chilled iron rollers, inclosed by the front of the hanger and cap, and as these rollers pass under the stud, they are returned over it in succession. There is consequently no friction, except that of rolling surfaces. Its leading advantages are:

GREAT DECREASE OF FRICTION, moving (as determined by direct experiment) with **one-fourth the power required by any other Hanger in the world.**
Great Strength. Unlimited Durability.
No Axles and Sheaves to grind and break.
All bearing surfaces harder than steel.
Thorough protection from the weather.
It will not clog with snow and ice.
It cannot run off the track.
It causes the door to run perfectly true.
It cannot get out of order.
It is compact, Simple and Beautiful in design.

This Hanger will fit any ordinary rail, but our rail is preferable, from the fact that it has a double flange at the bottom, so that the screws will not work out and allow it to rock or tip over.

No. 1 Hanger, corresponding to 4, 5 and 6 in. Sheaves or Rollers..... per pair, $1·25
No. 2 " " 6 inch and upward..... " 1·50
One Dozen Pairs in each case.—dis 30 per cent.
RAIL, with Double Flange.....per foot, 7 cents.
200 *feet in each case.*—dis 30 per cent.

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Of **Uniform** temper and finish. Solid **Steel Caps** and **Warranted. PATENT FORGED OX SHOES.** The **only** Shoe made with **concavity** to fit hoof, and the best and **cheapest. BENCH AND MOULDING PLANES** of every description. Also, Plow and Match Bits, Moulding and Rabbet Irons, Plane Stops, Cuts, Starts, Plates, &c., &c. Drop Forgings to order. Address for Catalogue and Prices

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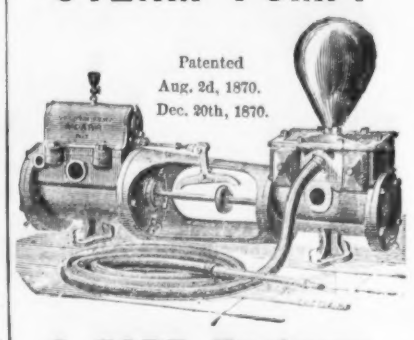

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Dec. 20th, 1870.

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It is Unsurpassed as a Mining Pump

CARR'S POSITIVE
CIRCULATING
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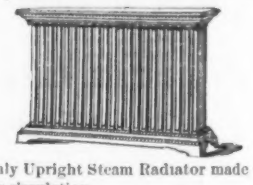

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No auxiliary valves used. Direct connection between piston rod and valve movement. No knocking or jarring. Circulars and price lists sent upon application.

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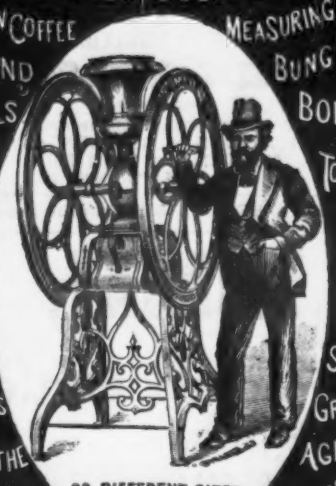

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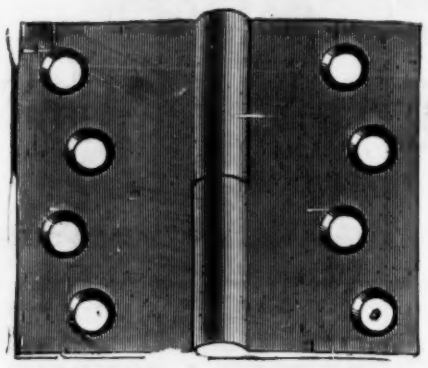

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Made of Wrought Iron or Brass, very super quality, and only an auger used in mortising.

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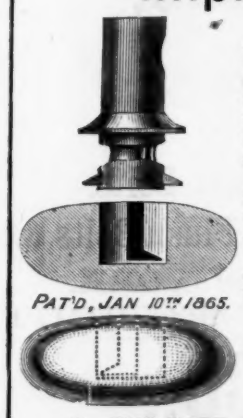

On the 10th January, 1865, we obtained Letters Patent for improved method of securing necks to Mineral and Porcelain Door Knobs, which improvement was used by us long enough to prove its utility, but on account of unsettled claim of joint ownership by former partner, its use was discontinued. Having now made a further improvement, for which we have made application for a Patent, we are now making the **BEST SECURED** and **MOST DURABLE** Mineral and Porcelain Door Knobs ever offered in this or other markets.

We solicit orders for these Knobs at our regular prices for old styles, with the understanding that if any can be loosened from or gotten off the necks without breaking the tops, they may be held by the purchaser subject to our order, with expenses added.

See *The Iron Age*, of August 21st., page 11, for illustrated description of our patent **Telescope Locks and Latches,** with patent Flat Steel Perforated Keys,

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Easily Applied and not Liable to get out of Order."—From Report of Judges at American Institute Fair, 1872.

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The Challenge Springs are manufactured from **Steel Wire, tempered by an Improved Process,** the result of repeated experiments, and must not be classed by dealers with the numerous worthless "Coil Springs" made from common **Bed Spring** Wire.

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The best machine by far, for the trade and the public.

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Is highly recommended by all dealers that keep it.

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Peter Wright's.....₱ lb, gold, 12½c
Wilkinson's.....11½c
Eagle.....11 cents currency—dis 15 @ 15&5 %
Apple Parers.—Union.....per doz $6 50 net
Skeleton..... " 6 25 net
Victor..... " 6 75 net
Domestic..... " 7 00 net
Reading..... " 7 00 net
Bay State Paring, Coring and Slicing.. " 12 00 net
" " Peach Parers..... " 10 50 net
Axes.—Mann's Light.....Per doz. $13 00 @ 12 50
Hunt's Light..... " 13 00 @ 12 50
Red Indian, all sizes..... " 12 50 @ 12 00
Red Chiertain, all sizes..... " 13 00 @ 12 50
Crown Prince..... " 13 50 @ 13 00
Augers and Auger Bits.—Pierce's Pat. Twist Bits.....dis 25 @ 30 %
Douglass' & Ives' Bits.....dis 30&10 %
Connecticut Valley Auger Bits.....dis 35&10 %
Cook s Bits.....dis 40&10 %
Jennings' Bits.....dis 10 %
Bates' Nut Augers.....dis 30&5 %
Douglass' & Ives' Augers.....dis 30&10 %
Watrous' Ship Augers.....dis 10 %
Bonney's Pat. Hollow Augers.....dis 25 %
Stearns' Patent Hollow Augers.....dis 25 %
Balances.—Landers Frary & Clark's.....dis 15 %
Chattillon s.....dis 15 %
Morton's.....dis 15 %
Common Spring with Hook.....₱ doz $1 38 @ 2 00
Bells.—Bevin Bros. Mfg Co. Light Hand Bells.....dis 60&10 %
Other makers light.....dis 65&10 %
Swiss Pattern Hand Bells.....dis 50 %
Connell's Door Bells.....dis 50 %
Great Western and Kentucky Cow.....dis 50&10 %
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Spontaro.....dis 40 @ 40&5 %
Butts.—Cast Fast Joint, Narrow.....dis 40 @ 40&5 %
" " Broad.....dis 50 @ 50&5 %
Cast Fast Loose Joint.....dis 50 @ 50&5 %
" Acorn, Loose Pin.....dis 40&10 %
Wrought Loose Pin.....dis 35 %
" Table Hinges and Back Flaps.....dis 30 %
" Narrow.....dis 30 %
" Loose Joint.....dis 35 %
" Reversible.....dis 35 %
Parker's Butts, Shepard's " " , Clark's " " , Cherrytree " " for wood, Lull & Porter's.....dis 50 %—dis by the case 50&5 %
Clark's Mortise Butts.....dis 40 %
Chains.—German Halter.....dis 15 @ 20 %
" Coil.....dis 15 @ 20 %
Galvanized Pump.....₱ lb 15c
Best Proof Coil Chain—

₱ lb..	13½	10¾	9¼	9	8¾	8½	8c gold
	3-16	¼	5-16	⅜	7-16	½	⅝ in.

By the cask, 360 lbs., discount ¾c per lb. Common Chain, ½c per lb. less than proof.
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₱ doz..	$3 00	3 25	3 62	4 00	4 50	5 00	5 50	6 00	7 50
No....	0	1	2	3	4	5	6	7	8

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₱ doz..	$2 80	3 00	3 38	3 75	4 12	4 50	5 00	5 62	6 75
No....	0	1	2	3	4	5	6	7	8

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Nicholson Mill Files...new list, $5 00 to £ cur dis 12½ %
" Bastard.. " 5 00 to £ cur dis 12½ %
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Butcher's Mill.....$5 50 to £ gold
" Bastard..... 5 50 to £ gold
Taper..... 5 50 to £ gold
Fluting Machines.
K. F. M.—4½ in. rolls, $5 00.....dis 10 %
" —6 in. rolls, $6 75.....dis 10 %
Mrs Knox—4 in. rolls, $5 00.....dis 10 %
" —6 in. rolls, 6 75.....dis 10 %
Hammers.
Yerkes & Plumb's.....dis 12½ %
Hammond & Son's.....dis 12½ %
Verce.....dis 12½ %
Hatchets.
Beatty's.....dis 10 @ 15 %

Shingling and Half. { ₱ doz..	$7 00	7 50	7 75	8 00
{ No.....	1	2	3	

Yerkes & Plumb.....dis 15 %

Shingling and Half. { ₱ doz..	$7 00	7 50	8 00	8 50
{ No.....	1	2	3	4
Claw.... { ₱ doz.	$7 50	8 00		
{ No.	1	2		3

Hinges.—Strap and T.....dis 30&10 %
Parker's Blind, Shepard's " , Clark's " for wood, Cherrytree Blind for wood. } Discount 50 %. By the case 50&10 %.
Lull & Porter's Blind.....dis 40&10 %
" " by the case dis 50 %
Clark's Mortise Blind.....dis 40 %

Horse Nails.	Nos.	6	7	8	9	10
Ausable		27	25	24	23	22
Globe		28	26	25	24	23
Brundage		26	24	23	22	21
	Nos.	5	6	7	8	9	10
Putnam		32	28	26	25	24	22

On Ausable, Globe and Brundage 1000 lb lots.....dis 5 %
Knobs.—Door, Mortise and Rim.
Makes in Combination.....new list dis 45 %
Extra discount for cash 2 %
Mineral and Rim.....dis 5 %
Locks and Latches.—Rim and Mortise.....dis 45 %
Extra discount for cash 2 %
Till and Cupboard.....dis 25 %
American Padlocks.....dis 50 %
Scandinavian Pad Locks.

₱ doz.....	$10 50	10 50	12 00	12 00	15 00	15 00	} dis 15 %
No.....	9	9¼	10	10¼	11	11¾	
₱ doz.....	$15 00		18 00		22 00	22 00	} dis 15 %
No.....	12		12¾		13	13¾	

Trunk Locks.....dis 5 @ 10 %
Thumb and Rogzens Latches.....dis 25 %
Lanterns.—Square Candle and Oil.....dis 10 %
Globe for Oil.....dis 10 %
" " Kerosene.....dis 10 %
Tubular Lanterns.....dis 10 %
Mattocks.—Long and Short Cutter.....dis 25 %
Western Pattern.....dis 25 %
Pennsylvania Pattern.....dis 15 %
Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets.....dis 20 %
Stebbins' Gates.....dis 60 @ 60&10 %
Lincoln's " .....dis 40 @ 40&10 %
Landers, Frary & Clark's Petroleum...dis 10 @ 10&10 %
Taylor's Petroleum Faucets.....dis 20 @ 20&10 %
Brass Liquor Cocks.....dis 20&10 %
Meat Cutters.—Dixon's.....dis 10 %
Woodruff.....dis 10 %
Stowe.....dis 10 %
Hale's.....dis 25 %
Stuffers.....dis 10 %
Planes.—Auburn Tool Co., "Bench".....dis 35 @ 35&5 %
Second Quality.....dis 50 %
Metallic Plane Co.....dis 25&5 %
Evans Pat. Circular.....net
Plane Irons.—American.....list net
Butcher's.....gold £, $5 50
Picks.—Philadelphia.....net
Pittsburgh.....net
Plumbs and Levels.
Stanley Rule and Level Co.....dis 60&10 %
Wm. Johnson, (Stanley List).....dis 60&10 %
Rakes.—Cast Steel Garden.....dis 33½ %
Malleable Garden.....dis 33½ %
Wood Head Iron Teeth.....dis 20 @ 40 %
Rules.—All Maker's Boxwood...dis 60&10 @ 60, 10&10 %
All Makers Ivory.....dis 50 %
Steelyards.—American Pattern.....dis 15 %

₱ doz.....	$5 50	7 00	9 00	10 00	11 00	12 00
No.....	50	100	150	200	250	300

English Pattern.....dis 15 %

₱ doz.....	$7 00	8 67	10 67	12 67	14 67	16 67
No.....	50	100	150	200	250	300

L. F. & C. Excelsior.....dis 10 %

₱ doz.....	$9 00	10 00	12 00	15 00	18 00	21 00
No.....	50	100	150	200	250	300

Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened.....₱ doz. $11 00 net
Clipper No. 10, Boxed and Sharpened.....₱ doz $10 50
" " 5, " " " 10 00
Common Scythes.....₱ doz $7 00 @ 10 00
Squares.—Steel and Iron, new list.....dis 50 %
Saws.—Disston's Cross Cut.....dis 12½ %
Disston's Hand.....dis 12½ %
W. McNiece's H'd, Cross-Cut & Circ'r, new list.dis 15 %
Boynton's Lightning, new list.....dis 30 %
Shovels and Spades.
Rowland's Plain Back, list Sept. 1st.....dis 30 %
" Back Strap " .....dis 0 %
Oliver Ames & Sons.....new list dis 12½ %
Brady Shovel Co.....dis 12½&5 %
Sad Irons.—Richmond (polished face), per lb. 4 c. net
Richmond (polished face)... by the cask " 3¾c. net
Stone.—Arkansas Oil, No. 1.....₱ lb $1 25
Turkey Oil, No. 1..... " 1 00
Washita Extra..... " 30c
" No. 1..... " 22c
" " 2..... " 18c
" ..... " 5½c
Screws.—Iron.....new list, Jan. 1st, 1874, dis 54¼ %
Brass.....dis 5½ %
Spoons.—
Plated.....dis 40&5 %
Britannia.....dis 40&10 %
German Silver.....dis 30 %
" Light.....new list dis 15&5 %
Lalance & Grosiean Iron.....dis 10 %
Springs.—Gray's Door.....dis 40 %
Torry's Door.....dis 40 %
Stocks and Dies......dis 15 %
Stove Polish.—Gem.....₱ gross, $5 00
Onyx..... " $5 00
Try Squares.—Winterbottom.....dis 10 @ 15 %
Stanley Rule and Level Co.....dis 45&10 %
Willis Thrall, No. 2.....dis 30&10 %
Disston's No. 2.....dis 40 %
Tacks, &c.—Half Weight Tacks.....dis 72½ %
" " by the case...dis 72½&7½ %
Clout and Finishing Nails.....7½ %
" " by the case.....dis 7½ %
Traps.—Genuine Oneida—Newhouse list.....dis 20 %
Imitation " " .....dis 30 %
Vises.—Solid Box.....₱ lb net 15c
Wrenches.—Coes Genuine.....dis 40 %
Coes Imitation Wrought Bar.....dis 50 %
" " Malleable Bar.....dis 60 %
" " (Kellogg's) Malleable Bar.....dis 50 @ 10 %
Tafts Pattern (Wrought Bar).....65 %
" " Kellogg's (Nail Bar).....dis 65&10 %
Philadelphia Tool Co.'s Pat. Duplex.....dis 25 %
" " " Improved Baxter.....dis 25 %
" " " Adjustable Fork.....dis 25 %
Wire.—No. 0 to 18.....dis 40 %
No. 19 to 26.....dis 45 %
No. 27 to 36.....dis 45 @ 47½ %
Coppered 0 to 12.....dis 15 @ 20 %
Tinned Broom Wire.....dis 20 %
Galvanized Wire No. 0 to 18.....dis 40 %

BUFFALO.

Reported by Messrs. Sidney Shepard & Co.

Sept. 12, 1874.

Augers—Snell Mfg. Co.....dis 20 %
Bits, Auger—Snell Mfg. Co.....dis 20 %
Bells, Cow—Naw s Genuine.....dis 30 %
Bolts—Carriage and Tire.....dis 75&10 %
Braces—Bit, Spofford's Patent.....dis 40&5 %
Brads, Cut.....dis 50&7½ %
Boards—Stove, Brooks' Patent.....dis 30 %
Butts—Brass.....dis 25 %
Wrought Narrow.....dis 30 %
" Broad, Loose Joint.....dis 35 %
" Table and Back Flaps.....dis 30 %
Wrought Butts, Loose Pin.....dis 35 %
Belting—Rubber.....dis 30 @ 35 %
Leather, new list, oak tanned.....dis 20 %
Brick—Bath (box of 2 doz) Best English.....$1 50
" Rutherford".....$1 00
Chalk—White, Carpenter s.....₱ gross, 50c
Red, Carpenter's..... " 75c
Blue, " " 90c
Chisels—Firmer Socket.....dis 60&10 %
Framing Socket.....dis 60&10 %
Corner Socket Chisels.....dis 60&10 %
Slick's Carpenters'.....dis 60&10 %
Castings—Malleable.....₱ lb 10c
Clothes Wringers, "Novelty" No. 2.....₱ doz $58 00

Elbows—Corrugated.....	5	5½	6	7	} dis 10 %
Charcoal.....	$3 50	4 50	5 25	6 50	
Russia.....	7 00	9 50	12 00	14 00	

Files—Maischoss Bros.....dis 50 %
Freezers Ice Cream—"Champion".....dis 33½ %
Hammers—Henry W. Klp's.....dis 7½ %
Hinges—Window Blind—
Clark's.....dis 50&10 %
Shepard's and Standard.....dis 55&10 %
Wrought Strap and T.....dis 10&10 %
Hods, Coal—Plain, Black and Galvanized.....dis 10 %
Funnel, Black and Galvanized.....dis 10 %
Fancy and Helmet.....dis 10 %
Palace Coal Vases.....dis 10 %
Hooks and Staples—Wrought.....dis 60&10 %
Hooks—Belt.....dis 50&10 %
Hasps and Staples—Wrought.....dis 60&10 %
Sad Irons.....4c
Kettles—Brass.....₱ lb. 50c
Enameled.....dis 50&5 %
Knives, Drawing—Oval No. 1.....dis 60&10 %
Razor Blade.....dis 50&10 %
Lanterns "Peerless,"....No. 1 5 10
₱ doz $26 00 $10 50 $13 75 dis 10 %
Tubular.....
" with Guards.....
Machines—Apple Paring, "Turn Table".....8 00 ₱ doz
Mills, Coffee—Box and Slide, common.....dis 15 %
Box Union and Eagle.....dis 15 %
" American.....dis 15 %
Nails—Clout and Finishing.....dis 20 %
Shoe.....dis 7½ %

Horse, Ausable.....	No. 5	6	7	8	9	10
	30	27	25	24	23	22c
" " Finished & Pointed.....						add 1c ₱ lb
" " 1000 lbs.....						dis 5 %
" Clinton.....	No. 6	7	8	9	10	
	22	20	19	18	17c	

Packing—Rubber.....dis 30 @ 35 %
Pencils, Slate—Soapstone.....4 @ 6in.
30 40 50c. ₱ 100
Case lots.....dis 20 %
Paint—White Lead, U. S. Gov't.....₱ lb 9 c
Rivets—Iron, Black and Tinned.....dis 25&7½ %
Rope—Manila, ½ inch and larger.....₱ lb 15½c
Screws—"American Screw Co"—
Flat Head, Iron.....dis 52½ %
Flat Head, Brass.....dis 52½ %
Staples—Blind, Boardman s Pat., ½ & ⅝.....₱ lb 37c
Spoons, Iron Tinned.....dis 10 %
" by the case.....dis 20 %
Plated Rogers' A No. 1.....dis 40&10 %
Britannia.....dis 45&10 %
Squares—Steel and Iron.....new list 50 %
Shoes, Horse—H. Burden & Sons.....₱ keg $6 00
Saws—Henry Disston & Sons.....dis 10 %
Scales—Buffalo Scale Works.....dis 25 %
Fairbanks.....dis 15 %
Traps, Steel—Newhouse.....dis 20 %
Tacks—Half Weight Am. Iron.....dis 72½&7½ %
Vises—Parallel, Buffalo.....dis 20 %
Ware—French, Tinned and Iron.....dis 25 %
Stamped and Japanned.....dis 10 %
Cast Iron Hollow.....dis 33½ %
Tin Plates.—Add for each X.....2 50
10x14, IC. Charcoal...$11 25, 14x20 C. terne.....$10 25
12x12, " ... 11 75, 20x28 C, " ... 21 00
12¼x17, " ... 10 75, 20x28 X, " ... 26 00
14x20, " ... 12 25
Pig Tin—Straits.....38c @ 39c
Bar Tin.....39c
Solder.....No. 1, 15c; No. 2, 14c
Sheet Zinc—
"Lasalle".....570 lbs 100 lb casks
$10 00 $10 50 ₱ 100 lbs
Sheets.....$10 00
Iron Wire—Bright and Annealed.....dis 40 %
Coppered.....dis 35 %
Tinned.....dis 15 %

Tinned Broom, { Nos.	20	21	22	} dis 20 %
{	20c	21c	21c	

Copper—Sheathing 14 @ 18 oz.....₱ lb 33c
Planished.....₱ lb
Bottoms.....₱ lb 33c
Bolts.....₱ lb 35c
Braziers' Sheets.....₱ lb 37c
Sheet Iron.—
18 Common.....$4 95
24 Common.....5 25
24 W. D. Wood & Co., Smooth Finish.....5 90

Am. Russia.....	A.	B.
	15c	12c

Gen. Russia, No. 1 stained.....18c
" " clean.....19c
Galvanized.....dis 15 %

CINCINNATI.

Reported by Sellew & Co., Importers and Jobbers Metals, No. 214, 216 and 218 Main street.

Tin Plate.—I. C. 10x14 Charcoal.....$11 50 @ 12 00
I. X. 10x14 Charcoal..... 14 50 @ 15 00
I. C. Terne 14x20..... 10 00 @ 12 25
I. C. Terne 20x28..... 21 50 @ 25 00
I. C. Continuous..... 24 00
Block Tin.—
Pig.....₱ lb 27c @ 29c
Solder.—
S. & Co.....₱ lb 23c
Lead.—Pig.....₱ lb 7½c.
Copper.—
Ingot.....₱ lb @ 24c
Planished..... " @ 39c
Sheathing..... " @ 33c
Copper Drops " @ 33c
Zinc. Cask, 500 to 1000 lbs.....₱ lb 10 c
Case, 100 lbs..... " 11 c
Slab..... " 7½c
Brass.—
Roll, No. 6 to 20.₱ lb 38c
" 20 to 38. " 42c
Babbit Metal.—
Sellew & Co.....₱ lb 35c
Antimony.....₱ lb 17c
Bismuth.....₱ lb $4 00
Nickel.....₱ lb $3 50
Sheet Iron.—

Gen. Russia.....₱ lb 20c	Planished A.....₱ lb 15c
	" B..... " 12½c

	Com. B.	Fin. S. I. U.	Smooth D Re'fd.
15 to 20	4·4c	6·0c	8·0c
22 to 24	4·6c	6·1c	8·1c
26	4·8c	6·3c	8·3c
27	5·0c	6·5c	8·5c

Galvanized Iron.—Full bundles.....dis 20 %
Nos. 18 to 20.....12c | No. 26.....14c
22 to 24.....13c | 27.....15c
Bar Steel.—Silver, ₱ lb 16c; Crescent, 21c.
Iron Wire.....dis 33 %
Enameled Ware.....dis 45 %
One Piece Corrugated Elbows......dis 10 %

Charcoal Iron.		Russia Iron.	
4½ inch.....	₱ doz $2 50	4½ inch.....	₱ doz $5 00
5 "	" 3 50	5 "	" 7 00
5½ "	" 4 50	5½ "	" 9 50
6 "	" 5 25	6 "	" 12 00
7 "	" 6 50	7 "	" 14 00

Leader Elbows, Flat Crimp Retinned or Galvanized.—Dis. 10 %

	₱ doz.		₱ doz
2-inch.....	$1 75	2½-inch.....	$2 75
3-inch.....	2 25	3½-inch.....	3 25
4-inch.....	2 50	4½-inch.....	3 50

Sheet Iron Brand Pans.....₱ lb 11c
American Broilers.....₱ doz. $3 50
Tinmen's Machines.....dis 5 %
Sad Irons.....₱ lb. 3½c @ 4½c
Brass Kettles—Ausouia.....50c
Dog Irons.....3c

PITTSBURGH.

The following are the Card rates of Lewis, Oliver & Phillips, H. B. Newhad, 11 Warren St., New York, Agent. Iron, standard list assorted sizes, for large orders, c. card rate, 2 % off net.
Flat Rail (1¼x¼), punched and coun'sunk..4·4c ₱ lb net
Iron Wedges.....4½c ₱ lb net
Norway Nail Rods.....9¼c ₱ lb net
Crow Bars (in ordering please state whether "Wedge" or "Pinch" point).....5c ₱ lb net
Beetle Rings.....8¾c ₱ lb net
Fence Pickets—
¾ round, bent to shape, 30c ₱ ft. of fence, less 15 % off net.

	Discount off Standard List.
Carriage and Tire Bolts (new list)	70&10 % off net
Plow Bolts	30, 10&5 % off net
Stove Bolts	15 % off net
Machine and Square Head Bolts	30&10 % off net
Coach and Lag Screws	30&10 % off net
Bolt Ends	35 % off net

Pat. Hot Pressed Square and Hexagon Nuts, small sizes, from 3-16 to ⅜ in.....7½c ₱ lb off net
Pat. Hot Pressed Square and Hexagon Nuts, large sizes, from 7-16 to 2 in.....6 c ₱ lb off net
Washers, all made from new band iron, small sizes, from 3-16 to ⅜ in.....9 c ₱ lb off net
Washers, all made from new band iron, large sizes, from 7-16 to 1⅛ in.....7 c ₱ lb off net
Nuts and Washers in 25 lb. boxes, 1c ₱ lb ex. Nuts and Washers in lots less than one keg each size, 1c ₱ lb ex.
Nuts and Washers in 5 lb. boxes, 1½c. ₱ lb ex.
Harrow Teeth, in lots of 1 ton or more, packed in casks, 1 in. diam. 3½c ₱ lb net; ⅞, ¾ in. diam. 3¾c ₱ lb net; ⅝ in. diam. 4c ₱ lb net.
Patent Headed Harrow Teeth, packed in casks, ¾c ₱ lb ex
Skein Bolts, in bulk, in lots of 1 keg or more, ⅝ in. diam. 5¼c ₱ lb net; 9-16 in. diam. 6½c ₱ lb net; ½ in. diam. 7½c ₱ lb net. 1c ₱ lb extra when less than 1 keg of each size is ordered.
Screw Hook-and-Eye Hinges, ¾ to 1 in. diam. 9c ₱ lb net; ⅝ in. diam. 10c ₱ lb net; ½ in. diam. 12 c ₱ lb net.
Screw and Strap Hinges, in lots of 100 pairs or more, 14 to ⅜ in. long, 5½c ₱ lb net; 8, to & 12 in. long, 6¾c ₱ lb net
Strap and T Hinges.....20 & 10 % off net, delivery as customary.
For purchases amounting to $250 between May 30th and December 31st, 5 % extra off.
Screw Hitching Rings.....$5 25 ₱ 100 net
Duck Nest Tuyere Irons.....$14 50 ₱ doz net
Cast Iron Washers.....₱ lb 4c net
Bridge and Roof Bolts—
1 to 2 in. diam. over 8 ft. long.....₱ lb 4 c net
1 to 2 in. diam. from 4 to 8 ft. long..... " 4½c net
1 to 2 in. diam. from 1½ to 4 ft. long..... " 4½c net
⅝, ¾ and ⅞ in. diam. over 4 ft. long..... " 4¾c net
⅝, ¾ and ⅞ in. diam. from 1½ to 4 ft. long " 5½c net
Bridge bolts with upset ends.....¼c. ₱ lb extra
Wrought iron plates, punched.....5c. ₱ lb net

WAGON HARDWARE.

Wagon Box Strap Bolts—

10 in. long by 7-16 at Screw End, ₱ set of 8 bolts..							55c
12	"	½	"	"	8	"	70c
10	"	9-16	"	"	8	"	90c
12	"	9-16	"	"	8	"	
14	"	9-16	"	"	8	"	$1 00
10	"	⅝	"	"	8	"	1 00
12	"	⅝	"	"	8	"	
14	"	⅝	"	"	8	"	1 10
16	"	⅝	"	"	8	"	1 20

5c ₱ set for each additional inch over 14 in. All lengths made.
In ordering Box Strap Bolts please give diameter at Screw End.
Wagon Box Rods, narrow track, each.....18c
" " wide track, each.....20c
Single Tree Irons, ₱ set of four pieces.....38c
Wrought Iron Bolster Plates, 2¾ in. wide, ₱ set.....60c
" " 3 " " 65c
" " 3½ " " 70c
" " 3¾ " " 75c
Wagon Brake Ratchets, each.....16½c
" " " finished with guard, each..45 c
Wrought Hammer Straps, heavy pattern, each.....16 c
" " " light " each.....13½c
" Rub Irons, each.....11 c
Stay Chain Hooks, each.....8 c
Double and Single Tree Clips, figure 1, each.....9 c
" " " 2, each.....10 c
" " " 3, each.....12 c
Strap Bolts, Rods, Single Tree Irons, Bolster Plates, Brake Ratchets, Hammer Straps, Rub Irons, Stay Chain Hooks and Clips, in lots of 50 sets.....dis 25 %
Wagon Box Staples, 1¾ to 2¾ in. to clinch, ₱ 1000 $11 00 net
" " Bevel Box Iron, to rivet on, ₱ 1000 7 50 net
Neck Yoke Eyes, each.....4¾c net
" " with ⅝ rings, each.....7¾c net
King Bolts, ⅝, 1, 1¼, and 1¾ in. diam.....₱ lb 4½c net
Wagon Rivets, ex. large, flat, oval and steeple head, ¼ in. diam. all lengths..... " 8¼c net
Wagon Rivets, 3-16 in. diam., all lengths..... " 9½c net
" & Nails, in 5 lb paper boxes....₱ lb 1c extra
" " in 25 lb wood " .... " ½c extra
Wagon and Hinge Nails, ¼ in.....₱ lb 17 c net
" " 5-16 in..... " 19 c net
Double Tree Plates..... " 8½c net
Coupling " ..... " 5½c net
Tongue " ..... " 9 c net
Neck Yoke Plates..... " 11 c net
Tongue Cap Iron, 1¾, 2 & 2¼ in. wide, same price ₱ lb as Band Iron.
Wagon Chains, Stay Lock and Tongue, 5-16 in, ₱ lb 10½c net. ¼ in., 11½c. net

DETROIT.

(Reported by Messrs. Jewett & Root.)

Tin Plate.—Best Charcoal		Copper Bottoms	34c
IC, 10x14	$11 50	**Planished Copper.**—	
IX, 10x14	14 25	Sheathing, 14x48	41
XX, 10x14	17 00	Boiler Size, No. 7	43c
IC, 12x12	12 00	" " No. 8	42c
IX, 12x12	14 75	" " No. 9	43c
IC, 14x20	12 50	Tinning ₱ sheet, 14x48	10c
IX, 14x20	15 25	" " No. 7	10c
XX, 14x20	18 00	" " " 8	14c
XXX, 14x20	20 75	" " " 9	16c
XXXX, 14x20	23 50	**Pig Tin.**—	
DC, 100 Plate	11 00	Large Pigs	29c
DX "	12 25	Small Pigs	29c
DXX, "	16 50	Bars	30c
DXXX "	19 25	**Solder.**—No. 1	17c
DXXXX 100 Plate	22 00	No. 2	16c
IX, 14x14	23 50	**Bright Wire.**	dis 47½ %
IC, 10x14 W	11 00	**Sheet Iron.**—	
IX, 10x14 W	13 75	No. 18 Am. Com	4 80
Roofing Tin.—Best Char.		No. 24 Am. Com	5 00
IC. Terne, 14x20	$10 25	Pat. Am. Russia "A,	
IX, " 14x20	13 00	Nos. 24, 25 & 26	14½c
IC. Terne, 20x28		Russia, Nos. 9, 10, 11 & 12	15c
IX, " 20x28		Pat. Planished Russia	c
Coke Tin.—		Russia No. 9, 10, 11&12	c
IC, 10x14 Coke	9 50	W. D. WOOD'S & CO.'S SHEET IRON.—	
IX, 10x14, Coke	12 25	Nos. 15 to 20 Smooth	$6 10
IC, 14x20, "	10 50	" 21 to 24	6 50
Sheet Zinc.—		" 25 & 26	6 90
Any width	10c	" 21 to 24 Char'l	7 80
Copper.—		" 25 & 26 "	8 00
Sheathing	33c		

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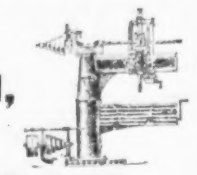

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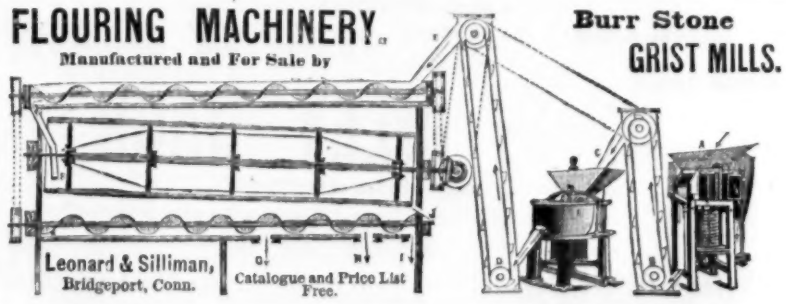

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Swede Spring Steel, especially adapted to Locomotive and Railway Car Springs.
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Boston, 21 Oliver Street.
New Orleans, La., 111 Gravier St.

BARROW HÆMATITE STEEL COMPANY,

LIMITED.

BARROW IN FURNESS, LANCASHIRE, ENGLAND.

MANUFACTURERS OF

Steel Rails, Tyres, Wheels,

Axles, Shafting, Boiler & Ship Plates, Bessemer Pig Iron, etc., etc.

CHAS. CONGREVE & SON,

Sole Agents for the United States,
104 & 106 John Street, opposite Cliff Street, NEW YORK.

J. & RILEY CARR,

MANUFACTURERS OF SUPERIOR

STEEL

For Tools, Cutlery, Saws, Files, Augers, Gimblets, &c.; Sheet Cast Steel for SPRINGS AND STAMPING COLD;

ALSO THE CELEBRATED

DOG BRAND FILES,

Unsurpassed, if equaled in quality.

Bailey Lane Works, Sheffield, England.
Warehouse, 82 John St., New York.

Established 1810

HENRY MOORE, Attorney.

Steel.

SANDERSON BROTHERS & COMPANY,

(LIMITED)

MANUFACTURERS OF THE

CELEBRATED CAST STEEL,

Warranted Most Superior for Tools and Granite Rock Drills.

DARNALL WORKS, ATTERCLIFFE FORGE, WEST STREET WORKS, } SHEFFIELD, ENGLAND.

IMPORTERS OF FILES,

AND

AGENTS FOR ARMITAGE'S GENUINE MOUSEHOLE ANVILS.

NEW YORK, Edward Frith, 16 Cliff.
BOSTON, H. L. Richards, 18 Batterymarch.
PHILADELPHIA, Wm. H. Sowers.
CLEVELAND, O., Cleveland, Brown & Co.
NEW ORLEANS, Rich'd Rhodes, 71 Camp.
BALTIMORE, Md., Wm. H. Cole.
MONTREAL, Saint Paul St.
NEW HAVEN, Ct., Atwater, Wheeler & Co.

FRANCIS HOBSON & SON,

97 John Street, NEW YORK,

Sole Manufact'rs of "CHOICE" Extra Cast Steel.

Manufacturers of all Descriptions of Steel.

Manufacturers of Every Kind of Steel Wire.

Don Works, Sheffield, England.

JOHN HOGAN, Agent.

S. & C. WARDLOW,

MANUFACTURERS OF THE CELEBRATED

Cast and Double Shear STEEL,

In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Table, Carving, Butcher and Shoe Knives, Turning Tools, Dies, Files, Clock or other Springs, Saws and Tools of every variety.

SHEFFIELD, ENGLAND.

Office of S. & C. WARDLOW, 13 Gold Street, New York.

In calling the attention of consumers of Steel in any of the parishes above enumerated, we would respectfully assure them of our ability to supply an article that cannot be excelled in quality, temper, and adaptation in all respects to the various purposes for which it may be required. Half a century of practical experience in all departments of Steel manufacture, a long established reputation in England, and the Continent of Europe, and in the Eastern States principally of this Country, encourage us to solicit a universal trial of our Steel for the above or other purposes for which a first class material in quality, temper, and durability is needed.

G. SANDERSON & CO.,

Manufacturers of all descriptions of

STEEL.

Bailey Street and Broad Lane Steel Works, } SHEFFIELD, ENGLAND.

Particular attention is paid to quality and temper for

Files, Saws, Table and Pocket Cutlery, Augers, Shovels, &c.

ALSO STEEL of superior quality for Turning Tools, Taps, Dies, Drills, &c.

Hot and Cold Rolled Sheets for Clock Springs, Corset Clasps, Pens, &c.

☞ *Makers of the Celebrated ROCK BORING DRILL STEEL.*

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JOHN A. GRISWOLD & CO.,

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MANUFACTURERS OF

Bessemer Railway Steel,

MERCHANT BARS, TIRE AND SHAFTING,

Railroad Iron, Pig Iron, Merchant and Ship Iron,

AGENCIES IN BOSTON AND PHILADELPHIA.

D. G. GAUTIER & CO.,

MANUFACTURERS OF

Hammered and Rolled STEEL of every description

JERSEY CITY, NEW JERSEY.

DUDLEY G. GAUTIER. JOSIAH H. GAUTIER.

CHROME STEEL COMPANY,

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CHROME CAST STEEL,

WARRANTED SUPERIOR TO ANY STEEL IN THE MARKET—EITHER ENGLISH OR AMERICAN—FOR EVERY PURPOSE.

Principal Office, 110 Liberty St., N. Y., WILLIAM TOOTHE, General Agent.

AGENCIES,

Potter & Hoffman, Philadelphia, Pa.
Harris, Rice & Co., St. Louis, Mo.
Kimbark Bros. & Co., Chicago, Ills.
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Works, Corner of Keep St. & Kent Ave., Brooklyn, E. D.

Steel.

Sheffield Steel Works,

(Established in 1848.)

SINGER, NIMICK & CO.

Pittsburgh, Pa.,

Manufacturers of Extra Quality Tool

CAST STEEL,

Patent Rolled

SAW PLATES,

All descriptions of Cast and German

Spring and Plow Steel

Elliptic and Side Springs, Sent Springs.

AXLES, STEEL TIRE,

Plow Wings, Shares, Cultivators, Reaper Bars, Mow Bars, &c., &c.

Warehouse, 83 Water and 100 First Streets.

ISAAC JENKS & SONS,

Minerva & Beaver Iron & Steel Works

Wolverhampton, England,

MANUFACTURERS OF

"Jenks" Spring Steel, Cast and Swedes Spring Steel,

TIRE, TOE CORK, SLEIGH SHOE, BLISTER & PLOW STEEL.

Also, Plow and other Iron.

VAN WART & McCOY, Agents,

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A full assortment of "Jenks" Spring Steel in stock.

MILLER, BARR & PARKIN,

Crescent Steel Works,

PITTSBURGH, PA.

Manufacturers of all descript ot

STEEL

EQUAL TO ANY IN THE MARKET.

Office.....339 Liberty St.,

PITTSBURGH, PA.

Gunpowder.

GUNPOWDER

DUPONT'S

Sporting, Shipping, and Mining

POWDER.

DUPONT'S GUNPOWDER MILLS,

ESTABLISHED IN 1801,

Have maintained their great reputation for 70 years. Manufacture the

Celebrated Eagle Ducking, Eagle Rifle, and Diamond Grain Powder.

Also, SPORTING, MINING, SHIPPING, AND BLASTING POWDER.

of all kinds and descriptions.

For sale in all parts of the country. Represented by

F. L. KNEELAND

70 Wall Street, NEW YORK.

GUN-POWDER

LAFLIN & RAND POWDER CO.

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invite the attention of the the Hardware Trade to their facilities for delivering

BLASTING, MINING and RIFLE

POWDER

IN EVERY PART OF THE UNITED STATES from having agencies and magazines at all prominent points, beside our works at

Newburg, Saugerties, Kingston, and Catskill, N. Y.; Scranton, Carbondale and Pottsville, Pa.; Baltimore, Md., and Platteville, Wis.

The superiority is well known of our brands of Rifle Powder

Orange Rifle, Orange Ducking
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SAFETY-FUSE at wholesale.

Steel.

HUSSEY, WELLS & CO.

MANUFACTURERS OF ALL DESCRIPTIONS OF

CAST STEEL,

INCLUDING

Best Refined Steel for Edge Tools.

PARTICULAR ATTENTION PAID TO THE MANUFACTURE OF STEEL FOR

Railroad Supplies, Homogeneous Plates

FOR LOCOMOTIVES, BOILERS AND FIRE BOXES,

Smoke-Stack Steel, Cast Steel Forgings for Crank Pins, Car Axles, &c.

ALSO, MANUFACTURERS OF THE CELEBRATED BRAND

"Hussey, Wells & Co. Cast Spring Steel,"

For Elliptic Springs for Railroad Cars & Locomotives.

PENN AND SEVENTEENTH STS., PITTSBURGH, PA.

BRANCH OFFICES:

30 Gold St., New York. 13 & 15 Custom House St., Boston. 146 E. Lake St., Chicago.

Pittsburgh Steel Works.

ESTABLISHED IN 1845.

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MANUFACTURERS OF

BEST REFINED CAST STEEL,

Cast and German Plow and Spring Steel,

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LABELLE STEEL WORKS.

REITER, SUTTON & CO.,

MANUFACTURERS OF ALL KINDS OF

STEEL.

Also, Springs, Axles, Rake Teeth, &c.

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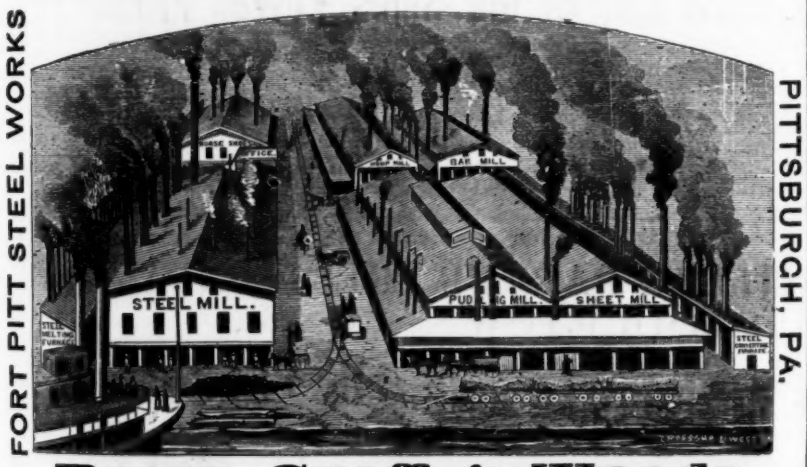
Post Office Address, Pittsburgh, Pa.



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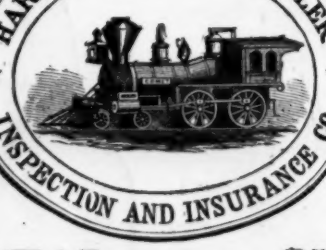
HARTFORD STEAM BOILER INSPECTION AND INSURANCE CO.



CAPITAL - - $500,000.

Issues Policies of Insurance, after a careful Inspection of the Boilers

COVERING ALL LOSS OR DAMAGE TO

Boilers, Buildings and Machinery,

ARISING FROM

STEAM BOILER EXPLOSIONS.

The Business of the Company includes all kinds of STEAM BOILERS

Full information concerning the plan of the Company's operations can be obtained at the

COMPANY'S OFFICE, HARTFORD, CONN.,

or at any Agency.

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THEO. H. BABCOCK, Manager.

New York Branch. No. 1 Park Place.

CHICAGO.

(Reported by Markley, Alling & Co.)

Agricultural Implements.—
Scythes—Dunn Edge Tool Co. ..... dis 30 %
Hay and Manure Forks—Otsego extra C. S. ..... dis 30 %
Hoes and Garden Rakes—Jackson and Otsego ..... dis 30 %
Scythe Stones ..... dis 25 %
Scythe and Bush Snathes ..... dis 25 %
Harvest Rakes and Barley Forks ..... dis 25 %
Revolving Horse Rakes ..... dis 25 %
Handles—Fork and Shovel ..... dis 25 %
Cradles—Nithington, Cooley & Co ..... dis 25 %
—Genuine Morgan ..... ₱ doz net $34 00

Augers and Bits.—
Ives' extra C. S. ..... dis 30 % | Snell's ..... dis 10 %
Jennings' ..... dis 5 % | " Car Bits ..... dis 10 %
Cook's ..... dis 30 % |

Axes.—Amoskeag Yankee ..... ₱ doz $12 00
Amoskeag Crescent ..... " 13 00
Hunt's Bronzed ..... " 12 00
Jefford's Silver Steel ..... " 12 50
M. A. & Co. Clipper ..... " 12 50
Mann's Red Warrior, Beveled ..... " 12 50
" Double Bitt ..... " 25 00
Handled Axes ..... " 15 00
" " Boys ..... " 12 00
Kennebeck ..... " 11 00

Bolts.—Carriage and Tire ..... dis 70 @ 10&5 %
Cast Barrel and Shutter ..... dis 20&10 %
Wrought Iron Barrel ..... add 10 %
" Square ..... net list

Butts.—Cast Fast Joint, Narrow ..... dis 30 %
Cast Fast Joint, Broad ..... dis 30 %
" Loose Joint ..... dis 50&5 %
" " Tip, Reversible ..... dis 40 %
" " Japanned ..... dis 35 %
" " Silver Tipped ..... dis 35 %
Wrought Narrow, Fast Joint ..... dis 30 %
" Broad " " ..... dis 30 %
" " Loose " ..... dis 37 %
" Loose Pin ..... dis 30 %
" Table ..... dis 30 %
" Brass ..... dis 10 %
Garretson's Blind Butts, Wood ..... doz sets $1 75
" " Brick ..... doz sets 2 75
Parker's " Wood ..... doz sets 1 85
" " Brick ..... doz sets 2 75

Casters.—Iron Plate ..... dis 25 %
Brass Wheel Plate ..... dis 25 %
Porcelain Wheel Plate ..... dis 25 %
" Bed ..... dis 25 %
Iron Wheel Bed ..... dis 25 %
Chisels.—Butcher's Tanged Firmer ..... dis 30 %
" Long Paring ..... dis 30 %
Witherby Socket Framing ..... dis 50&20 %
" " Firmer ..... dis 50&20 %
" " Corner ..... dis 50&20 %
" " Slicks ..... dis 50&20 %

Coffee Mills.

Box 4 Iron	$ 3 75	Box 85 Cast Steel	$12 00
" 103 "	5 25	Side 50	4 75
" 102 "	6 25	" 60	5 75
" 107 Britannia	7 50	" 70	7 25
" 106 "	8 50	" 90	18 00
" 25 Union	10 50	" 15 Union	7 00
" 35 "	12 00	" 20 "	8 00
" 75 Cast Steel	10 50		

Cutlery.—American Table ..... dis 20 %
" Pocket ..... dis 25 %

Door Springs.—Torry ..... ₱ doz $5 00
Rubber ..... " 4 00
Boon's ..... " 5 00

Drawing Knives.—Witherby Tool Co ..... dis 50&20 %
Ohio Tool Co ..... net list

Files.—Butcher's ..... $7 00 £
Nicholson's ..... $5 00 @ $5 50 £

Hammers.—
Maydole's ..... net list | Yerks & Plumb ..... net list
" | Chency ..... net list

Handles.

Extra Axe	₱ doz. $3 00	Coal Pick, No. 1	₱ doz $2 00
No. 1 Axe	" 2 25	Sledge, No. 1	" 2 00
No. 2 Axe	" 2 00	Hatchet	" 65
R.R. Pick, No. 1	" 2 00	Hammer, A. E.	" 65

Hatchets.—

	1	2	3
Amoskeag Shingling	$7 25	$8 00	$8 75
" Claw	7 75	8 50	9 22
" Lath	7 50	8 25	
" Solid Steel			12 00

Hinges.—Strap and T ..... dis 20&10%
Screw Hook and Strap, 5 to 12 in ..... 8c. ₱ lb
" " 14 to 24 in ..... 6½c. ₱ lb
Hook and Eye Hinges ..... net 12c. @ 16c. ₱ lb
Gate, No. 35, State ..... ₱ doz $3 50
" No. 3, In and Out ..... " 8 50
" Bilnn's Pat ..... " 7 50

Hog Ringers.—Hill's Patent ..... ₱ doz $6 00
Hill's Patent Rings ..... ₱ 100, 25c
" Tongs ..... ₱ doz $5 00

Horse Nails.—Northwestern, 8d 24c
Ausable, 8d 24c
Globe, 8d 26c

Kettles.—Brass ..... 51c | Enameled ..... dis 30&10 %

Locks and Knobs.

Norwalk Lock Co.	dis 45 %	EagleLock Co.	dis 15 %
Branford "	dis 45 %	Am. Pad Locks	dis 35 %
		Conti'al Lock Co.	dis 10 %
		Woodrun Patent	net list
		Stowe's Sausage Stuffers	net list
		Enterprise Patent	dis 5 %

Meat Cutters.—
Haven's Patent ..... net list
Hale's " ..... dis 10 %

Molasses Gates.—
Stebbin's Patent ..... dis 50 %

Nails.—10d to 60d ..... per keg $4 00

Oil Stones.—Washita No. 1 ..... net 30c ₱ lb
Washita Slips ..... net 60c "
Hindostan No. 1 ..... net 9c "
" Axe ..... net 10c "
" Slips ..... net 15c "

Picks and Mattocks.—Picks, Railroad, Axe Finish ..... ₱ doz $12 00
Picks, Coal, Axe Finish ..... " 10 00
Mattocks, L. C., Axe Finish ..... " 15 00
" S. C., " ..... " 14 50
Grub Hoes, Axe Finish, No. 2 ..... " 1 00

Planes.—Ohio Tool Co., Bench ..... dis 30 %
Sciota ..... dis 35 %
A. Howland & Co., Bench ..... dis 30 %
" Fancy ..... dis
Bailey Patent Iron ..... dis 15 %
Plane Irons, Butcher's ..... dis 30 %

Rivets.—Iron, dis 10 @ 15 % | Copper, No. 7, net, ₱ lb, 50c
Tinned ..... dis 10 @ 15 %

Rules.—Stanley Rule and Level Co ..... dis 50&10 %
Hubbard & Curtiss Mfg. Co. ..... dis 50&10 %

Sad Irons.—Best A No. 1 ..... ₱ lb, 4c
" Copper Face Star ..... ₱ lb, 4¼c

Sandpaper.
Baeder & Adamson's No. 0 to 1½ ... per ream, net $4 50
" No. 2 to 3 ..... net 5 00
Wiggin & Stevens, No. 0 to 1½ ..... ₱ ream, net, $4 50
" No. 2 to 3 ..... " 5 00

Sash Locks.—Champion ..... ₱ gross, net, $12 00
Hopkins & Dickinson ..... dis 10 %
Judd's Patent ..... dis 10 %
Corbin's Patent ..... dis 10 %
Clark's Patent ..... dis 20 %

Saws.—R. Disston & Sons ..... dis 10 %
Champion X Cut ..... ₱ foot, net, 60c
M. A. & Co. X Cut ..... " 50c
Lightning Cut ..... " 66c

Screws.—American Screw Co.—Iron ..... new list dis 50 %
American Screw Co.—Brass ..... dis 50 %

Shovels and Spades.

Ames' Black Shovels		₱ doz	$14 50
" Polished "		"	15 50
" Patent "		"	18 00
Alling "		"	16 00
" "	Molders'	"	18 00
Crane's Black "		"	11 50
" Polished "		"	12 00
Smith's "	B. S. L. H. Rd. Pt.	"	13 50
" "	B. S. D. H. Rd. Pt.	"	14 00
Ames' Black Spades		"	16 00
" Polished "		"	17 00
" Patent "		"	17 50
Alling "		"	16 00
Crane's Black "		"	12 50
" Polish'd "		"	13 50

Scoops.—Alling Steel Polished, No. 2 ..... ₱ doz, $13 50
Alling Steeled Polished, No. 3 ..... " 14 00
" " No. 4 ..... " 14 50
" " No. 5 ..... " 15 50
" " No. 6 ..... " 16 50
" " No. 7 ..... " 17 50
" " No. 8 ..... " 18 50
" " No. 10 ..... " 21 50
Crane's Polished, No. 5 ..... " 13 50
" No. 6 ..... " 14 50
" No. 7 ..... " 15 50
" No. 8 ..... " 16 50
Crane's Black Coal, No. 4 ..... " 17 50
" " No. 5 ..... " 18 00
Preston, Black Scoops No. 1 ..... " 12 00
" " No. 2 ..... " 12 50
" " No. 3 ..... " 13 00
" Half Pol. Scoops No. 1 ..... " 12 50
" " No. 2 ..... " 13 50
" " No. 3 ..... " 14 50
Lippincott, Half Pol. No. 2 ..... " 15 00
" " No. 3 ..... " 16 00

Wrenches.—Taft's ..... dis 60 %
Coe's Imitation ..... dis 50 %
Coe's Genuine ..... dis 35 %
Wringers.—Novelty Clothes Wringer ..... ₱ doz $65 00
Universal Clothes Wringer ..... " 69 00

Chicago Metal Market.

(Reported by Frank Sturges & Co., 72, 74 & 76 Lake St.)

Tin Plate.—

10x14, IC, Ch'l. Good		14x20, IX, Ch'l Best	$15 00
10x14, IC, " Best	11 50	14x20, IX X X	" 17 50
10x14 IX, " "	14 00	DC. 100 Plate, "	" 2 00
12x12, IC, " "	12 00	DX " "	" 11 50
12x12, IX, " "	14 50	DXX " "	" 14 00
14x20, IC, " "	12 50	DXXX " "	" 16 50
Roofing IC, Charcoal, Best			19 00
Roofing IX, Charcoal "			11 00
20x28, IC, Charcoal Roofing, Com			13 50
20x28, IC, " Good			21 00
20x28, IC, " Best			21 50
20x28, IX, " "			22 00
10x14, IC, Coke Plates			26 50
14x20, IC, "			10 00 @ 10 50
10x20, IC, "			10 50 @ 11 00
			16 50

Block Tin.—

Large Pigs	29c	Bars	30c
Small "	29c	Straits, 2c. higher.	

Zinc.—Sheet, 500 to 1000 lb. Casks 9¼c
Loose Sheets 10c
Slab Zinc or Spelter ..... 6½ to 7 c

Copper.—Bottoms:
Sheathing 32c
Planished 38c
" Boiler lengths 40c
Ingot ..... 24c to 26c
Bolt 40c

Brazlers' Sheets.—

30x60, 6 to 10 lbs	₱ lb 41c	30x60, 15 to 100 lbs	₱ lb 35c
30x60, 10 & 12 lbs	" 38c		

Solder.—F. S. & Co.'s make.

Best Fine	22c	Roofing	18c
No. 1	20c	Brazlers' or Spelt. Sold.	35c

Antimony 18c
Babbit Metal—F. S. & Co.'s 16c
No. 2 ..... 14c

Sheet Iron.—

	Common.	Smooth. Com.	Smooth Charcoal.	Smooth Juniata.
No. 24	5 c	6 c	7½c	9½c
25 & 26	5¼c	6¼c	7¾c	9¾c
27	5½c	6½c	8 c	10 c

Galvanized Iron ..... dis 20 %

No. 16 to 20	12c	No. 24	15c
21 to 24	13c	28	16c
25 & 26	14c		

Russia Iron.—
Perfect ..... 20c | No. 1 Stained 19c
" In Sheets, 1c. higher.

American Russia.—
A ..... 15c | B 12c
" In sheets, 1c higher.

Lead. | Lead Pipe, in full coils .8¼c
Pig ..... 7½c | Lead Pipe, when cut, .8½c
Bar ..... 8½c | Sheet Lead 8½c

Wire—Bright ..... dis 45 %
Coppered ..... dis 30 %

BOSTON.

(Reported by Macomber, Bigelow & Douse, 156 to 164 Oliver St.)

Apple Parers.—Reading ..... per doz $8 00
Augers.—Watrous Ship ..... dis 10 %
L'Hommedieu Ship ..... dis 15 %
Axes.—Forester's Favorite, Bronzed $12 50
Blue Jackets, Blue 12 00
Excelsior, Black 11 50
Chopper's Pride, Bronzed 11 00
Red Cross, Red 10 50
Red Cross, Handled 12 50
Boy's Handled Blue Jackets 12 00
Axe Handles.—Wadleigh's Oak—
A (Extra) $2 50, B (No. 1) $2 00, C (No. 2) $1 50 ₱ doz
Blind Hinges.—Washburn's ..... per hundred set $9 50
Blind Fasts.—Washburn's ..... per hundred set $5 75
Bolts.—Carriage, Phila., " Girard Works ..... dis 50&10 %
Borax.—Best Refined ..... ₱ lb 16c
Borers.—Angle, Backus' ..... dis 30 %
Boring Machines.—Angle ..... each $4 75
Common, Snell's quality ..... each 3 75
Braces.—Barber's ..... dis 40&5 %
Backus' ..... dis 50 %
Spofford's ..... dis 40 %
Brass Faucets.—L. F. & C ..... dis 25 %
Butts.—Union Drilled Loose Joint ..... dis 60& 0 %
" " Wire Fast Joint ..... dis 55 %
" " Acorn Loose Joint ..... dis 60&10 %
Brass Butts ..... dis 30 %
Wrought Table Butts and Back Flaps ..... dis 30 %
Wrought Narrow Butts ..... dis 30 %
Cartridges.—" U. S. Cartridge Co." ..... dis 50 %
Chisels.—"Buck Bros.' Shank Goods ..... add 20 @ 22½ %
Socket ..... add 22½ @ 25 %
Compasses and Dividers.—Bemis' ..... dis 35 %
P. S. & W ..... dis 25 %
Cordage.—Manila (usual trade dis.) ..... ₱ lb, 16c
American Tarred Hemp Lath Yarn ..... ₱ lb, 10c
Corn Hooks ..... per doz $2 75
Crow Bars.—Iron, Steel Points ..... ₱ lb, 5¾c
"Sweet" Steel Bars ..... ₱ lb 11c
Brown's Steel Bars ..... ₱ lb 10c
K. P. & Co. Extra Drill Steel ..... ₱ lb 15c
Dividers.—Cook's Nickel Plated ..... dis 15 %
Door Springs.—Stimson's Patent.—
No. 7, Light inside doors, $12 00 ..... dis 25 %
No. 8, " outside " $18 00 ..... dis 25 %
Torrey's $4 00
Emery.—Alden ..... ₱ lb 7c
Wellington Mills ..... ₱ lb 10c
Files.—Earl Smith & Co.'s English ..... $5 to £ gold
American ..... $5 to £ currency, less 12½ %
Nicholson ..... $5 to £ currency, less 1.½ %
" Regular Taper ..... dis 12½&5 %
Stubb's Tapers, genuine, 3 in., $1 50; 3½, $1 62; 4, $1 88; 4½, $2 13; 5, $2 50.
Funnel Irons.—$2 50 2 50 2 50 3 25 per doz
5, 5½, 6, 7 inch.
Deep Flange.—$3 50 3 75 4 00
5, 5½, 6 inch.
Hammers.—Maydole ..... dis 5 %
M., B. & D., solid cast steel, adze eye, No. 1, $10; 1½, 2, 3, 4, 5, $11; 1½, $9 75. " " " bell face, No. 1,
Hangers & Rollers.—Novelty ..... dis 30 %
Anti-Friction ..... $1 75 per pair—dis 30 %
Hatchets.—Underhill Edge Tool Co ..... dis 10 %
C. F. Dowse, warranted Cast Steel—
Shingling 0, $4 75; 1, $5 25; 2, $5 75
Claw 1, $5 75; 2, 6 25
Lathing 1, $5 50
Axe Pattern 1, $7 00; 2, 7 50
Broad ..... 0, $5 75; 1, $6 50; 2, $7 50; 3, $9 25; 4, $10 75; 5, $12 75; 6, $14 75.
Hinges.—Strap and T, Stanley Works ..... dis 20&10 %
Plate, Loose and Fast Joint ..... ₱ lb 7½c
Wrought Screw Hook ..... ₱ lb 8c
Hoes.—Ely Balch & Co. M., B. & D.'s list, 1874 ..... dis 25 %
Remington, M., B. & D.'s list, 1874 ..... dis 30 %
Lead.—Sheet and Pipe ..... 7½c—less 10 %
Locks.—P. & F. Corbin ..... new list dis 45&5 %
Nashua ..... dis 45&5 %
Manure Forks.—
Myers & Ervien, M., B. & D.'s list, 1874 ..... dis 25 %
Peck, Clark & Co., " " ..... dis 25 %
Shumway & Co., " " ..... dis 30 %
Mattocks.—K. P. & Co., axe finish, long cutter $13 75
Short cutter 13 50
Metal.—Babbitt, No. 1, 35c; 2, 25c; 3, 16c; 4, 15c ₱ lb
Nails.—10c. and larger $4 00
Padlocks.—Wilcox ..... dis 50&2 %
All Brass, 2½ inch, 2 keys, job lot $9 00
Picks.—K. P. & Co., Polished Points—
5 to 6 ..... per doz $9 00; 6 to 7, $9 50
Pins.—Universal Hat and Coat all wood—
2 in ..... ₱ gross $2 50; 3 in., 3 50; 4 in., 4 50—dis 25 %
Pointo Digger.—
"Partridge," 6 square tine ..... ₱ doz $12 00
Shumway & Co., 6 round tine ..... ₱ doz 9 00
Pulleys.—Clark & Co.'s Axle, 2 in ..... per doz 42c
Plated Ware.—Rogers Bros ..... new list dis 40&10 %
Plumb & Levels.—" Davis" Pat. Adjustable—
No. 1, Iron and Wood Center Levels ..... dis 50 %
No. 2, First Quality Levels ..... dis 60&10 %
No. 3, Iron Pocket " ..... dis 35 %
No. 4, Level and Plumb Glasses ..... dis 60&10 %
No. 5, Iron Pocket Levels, per square and straight edge ..... dis 50&10 %
No. 6, Improved Iron Bench Planes ..... dis 20&10 %
Pocket Knives.—Conn. Cutlery Co ..... new net list
Rakes.—Cast Steel, garden ..... dis 30 %
Malleable ..... dis 25 %
Rail Road Door.—For Novelty and Anti-Friction Hangers ..... per foot 7c.. dis 30 %
Rivets.—Black ..... dis 25 %
Carriage, oval head, Nos. 3, 4, 5, 6, 7, 8.
13 13 14 14 15 16c ₱ lb net
Sad Irons.—Bless & Drake ..... ₱ lb 4
Sand Paper—0 to 2, $4 25; 2 to 3, $4 75 ..... dis 10 %
Saws.—Disston's ..... dis 12½ %
Lightning X cut, Boynton's ..... per foot 6c
" Saw Blades, 32 inch ..... per doz $7 00
" Framed Saws ..... per doz 8 50
Common " ..... per doz 6 00
Disston " ..... per doz 9 00
One man X cut.—Lightning ..... $2 75 each
Disston's $3 00 each ..... dis 12½ %
Wheeler, Madden & Clemson ..... dis 15 %
" " Mill ..... dis 25 %
" " Circular ..... dis 25 %
Screws.—American Screw Co ..... revised list dis 52½ %
Scythe Stones.—
"Willoughby Lake," first quality ..... ₱ gross $6 50
" second quality ..... " 3 00
Shovels.—O. Ames ..... new list dis 12½ %
M. B. & D ..... new list dis 12½ %
Spading Forks.—M. & E ..... dis 25 %
Stone Pickers.—"Partridge," original ..... ₱ doz $15 00
Tools.—Aiken's Pattern, 20 in set; Parr's ..... $8 00 per doz
Traps.—Oneida ..... dis 20&5 %
Blake's ..... dis 30 %
Vises.—S. P. & Co.'s Solid Box, Blacksmith ..... ₱ lb 12c
Parker's Parallel ..... dis 10 %
Backus ..... dis 25 %
"Howards." Parallel ..... dis 20 %
Wardrobe Hooks.—Wire to drive ..... ₱ gross $1 00
Weights.—Window Weights ..... ₱ lb 2¾c
Wire Netting.—Clinton Wire Cloth Co., Green, Drab or Black ..... ₱ ft 6c
Wrenches.—Genuine Wrenches, A. G. Coes ..... dis 40&5 %
Wringers.—
Novelty and Universal } Tub No. 2 } ..... market unsettled
Eureka ..... per doz $60 00
Novelty Bench, No. 4 ..... market unsettled

Boston Metal Market.

(Corrected by Fuller, Dana & Fitz.)

Tin Plates.—₱ box

I. C. Char. 10x14	@ $11 50	Coke IC, 14x20, 10 25	
I. C. Coke 10x14	9 50	**Pig Tin.—**	₱ lb
Char. Roof. IC, 14x20, 11 25		Banca	30c
Coke IC, 14x20, 10 25		Straits	23c
		English	24c

Zinc.—Sheet ..... ₱ lb 10c
Iron.—Sheet Iron, Russia ..... " 18c
Sheet Iron, English ..... " 5 c
" " American Refined ..... " 5¾c
" " Galvanized ..... " 10c
Plate Iron ..... " 4
wedish and Norway Bar Iron, gold ..... ₱ ton, $122 50
" " Shapes, gold 127 50
Norway Nail Rods, first quality, gold 145 00
" " second " 135 00
Best Refined Bar Iron 67 50
The "Burden Best" Iron 106 40
American Pig Iron, Foundry, No. 1, x 31 00
" " No. 2, x 31 00
" " Gray Forge 28 00
Scotch Pig Iron ..... ₱ ton 36 00 @ 39 00
Wrought Scrap Iron 35 00
Steel.— ₱ lb
Eng. Tool 18c
American Tool 15c
" Mach 10½c
Ressemer 7½c

Copper.— ₱ lb
Sheathing 33c
Bolt 34c
Ingot 22c
Lead.— ₱ lb
Pig 6¾c
Sheet & Pipe, 8 4c, dis 10 %
Spelter ..... ₱ lb 8c
Antimony ..... ₱ lb 14c
German 10½c
Spring 4½c
Tire 6¾c
Sleigh Shoe ..... 5 c
Toe Calk 7¾c

ST. LOUIS.

Corrected weekly by Semple, Birge & Co.

Anvils.—Armitage ..... ₱ lb, gold 12c
Peter Wright's ..... " 14c
Wilkinson's ..... " 12½ c
Apple Parers.—Conqueror ..... ₱ doz, $9 00
Lightning 9 00
Turn Table 9 00
Axes.—Hunt's ..... ₱ doz $13 00 @ 13 50
Lippincott's ..... " 12 00 @ 13 00
Lippincott's Pioneer ..... 13 00 @ 13 50
Simmons' ..... " 12 00 @ 13 00
Axles.—Kritch & Crane Mfg. Co.'s—
Patent Taper Axles ..... new list net
Swelled Taper Axles ..... new list net
Concord Axles ..... new list net
Red Jacket Axles ..... new list net
Common Axles, 1½ inch and upward ..... ₱ lb 8¼c
" " less than 1½ inch ..... " 8¾c
Bellows.—"Best St. Louis make" 60c ₱ n. dis 20 %
Bells.—Troy, Church ..... ₱ lb, 43c
Light Brass Hand ..... dis 50 %
Moore's, Cow ..... dis 20 %
Bolts.—Arms, Bell & Co.'s Machine ..... dis 20 %
Arms, Bell & Co.'s Carriage and Tire ..... dis 75 %
Cast Butt Hinges.—Western Butt Co.'s—
Narrow Fast Joint ..... dis 35 %
Broad Fast Joint ..... dis 50 %
" Loose " ..... dis 60 %
Reversible ..... dis 55&10 %
" Japanned and Silver Tipped ..... dis 50 %
Loose Joint "Acorn" " " ..... dis 55 %
Lull & Porter's Blind ..... dis 50 %
Wrought Butts.—Narrow ..... dis 25 %
Reversible ..... dis 30 %
Broad ..... dis 30 %
Chain.—Eng. Coil..3-16 ¼ 5-16 ⅜ 7-16 ½ n.
15 11 10 9½ 9 8c gold
Trace ..... 6½ 10-2 65c "
7-10-2 70c "
German Coil and Halter ..... revised list add 10 %
Chisels.—Socket, Firmer or Framing ..... dis 60 %
Clothes Wringers.—Crown ..... ₱ doz $60 00
Novelty ..... " 69 00
Universal ..... " 69 00
Monitor ..... " 69 00
Corn Cutters or Hooks.—Solid Steel ..... ₱ doz $4 00
Corn Knives.—Dunn Edge Tool Co.'s Clip ..... ₱ doz $5 75
Disston's ..... " 6 00
Crow Bars.—Steel Pointed ..... ₱ lb 7c
Cutlery.—J. Russell & Co.'s, Lamson, Goodnow & Co.'s, Landers, Frary & Clark's } at minimum list, net
Files and Rasps.—
Nicholson's Files ..... $5 00 less 5 %
Butcher's Mill $6 75
Heller's & Bros. Horse Rasps ..... dis 40 %
Forks and Hoes.—
Auburn Mfg. Co.'s Hay and Manure Forks ..... dis 30 %
" " Standard Hoes ..... dis 30 %
" " Planter Eye Hoes ..... add 15 %
Winsted's Planter Eye Hoes ..... add 15 %
Hammers.—Yerkes & Plumb ..... dis 5 %
Masons' Hammers ..... ₱ lb 28 c
Smith Hand Hammers ..... " 21 c
Handles.—Axe ..... Extra. $2 75 | No. 1. $2 25 | No. 2. $1 75 | No. 3 $1 00
Pick ..... Extra. $2 50 | No. 1. $2 00 | No. 1½ $1 75 | No. 2 $1 50
Smith & Montross Fork, Hoe and Rake ..... dis 20 %
Harrow Teeth.—1 inch iron ..... ₱ lb 4½c
⅞ and ¾ inch iron ..... " 4¾c
⅝ inch iron ..... " c
Barbed or Headed ..... ½c extra
Hatchets.—Hunt's ..... dis 10 %
Simmons' ..... dis 15 %
Hay Knives.—Lightning ..... ₱ doz $20 00
Dunn Edge Tool Co.'s ..... ₱ doz $14 50—dis 15 %
Fisher's ..... " 16 50—dis 10 %
Hinges.—Strap and T—St. Louis make ..... dis 25&10 %
Horse Nails.—Ausable ..... 22c rate
Northwestern ..... 22c "
National Patent Pointed ..... 21c "
" " Extra Finished ..... 22c "
Horse Shoes.—R. I. (Perkin's pat) ..... ₱ keg $6 50
Burden's ..... " 6 50
Mule Shoes ..... " 7 50
Rhode Island Trotting Shoes ..... " 9 00
Locks and Latches.—
Jones & Nimick's ..... revised list dis 40 %
Moorhead, Adams & Co ..... revised list dis 40 %
Norwalk Lock Co.'s ..... revised list dis 40 %
Mattocks and Grub Hoes.—
Klein, Logan & Co.'s Mattocks ..... ₱ doz. $14 75 @ 15 00
" Grub Hoes, Oval Eye ..... ₱ doz. 10 75 @ 12 00
Nails.—Wheeling ..... $3 75 rates
Orders for 100 kegs 10c ₱ keg less.
Picks.—Klein, Logan & Co.'s R. R. and Clay ₱ doz. $11 00
Klein, Logan & Co.'s Coal ..... " 8 00
" " Poll ..... " 11 00
" " Stone ..... " 14 50
" " Tamping ..... " 17 00
Planes.—Ohio Tool Co.'s ..... dis 30 %
Sciota ..... dis 40 %
Post Hole Augers.—Clark's Patent—
No. 1, ₱ doz. $27; No. 2, $30; No. 3, $32 ..... dis 30 %
Barton's Patent ..... ₱ doz $25—dis 20 %
Vaughn's " ..... " 25—dis 10 %
Sad Irons.—Monitor Brand, Silver Polished ..... ₱ lb 6c
Sash Weights.—Standard Solid Eyes ..... ₱ lb 3½ c
Saws.—Disston's ..... dis 10 %
Hubbard, Lippincott, B. & Co.'s ..... dis 10 %
Branch, Crooks & Co.'s ..... dis 15 %
Livingston's Patent Buck ..... net list
Screws.—American Screw Co.'s revised list ..... dis 50 %
Scythes.—
Dunn Edge Tool Co.'s ..... new list dis 25 %
Paris Furnace Co.'s ..... dis 50 %
Scythe Stones.—No. 1 Ind'a Pond ₱ gr's, $7 00
Extra Indian Pond ..... " 7 50
Premium ..... " 9 50
Diamond Grit ..... " 13 50 } dis 25 %
Shovels, Spades and Scoops.—
Ames'. ..... dis 10 %
Lippincott's ..... dis 20 %
Rowland's Maxwell ..... revised list dis 15 %
Sledges.—Smith's Stone or Coal Sledges—
Steel Face Polished ..... ₱ lb, 14c
Solid Cast Steel ..... " 3½c
Spaths and Cradles.—Seymour Mfg. Co.'s ..... dis 25 %
Springs.—Cleveland Spring Co.'s—
Carriage and Express ..... dis 10 %
Blue Seat Springs ..... new list dis 15 %
Tacks.—Norway Tack Co.'s ½ weight ..... dis 72½ %
Brads ½ weight ..... dis 50 %
Thimble Skeins.—Pump & Skein Co.'s ..... dis 55&5 %
Traps.—Newhouse Patent ..... dis 15 %
Vises.—Solid Box ..... ₱ lb 10c
Wilson Mfg. Co.'s ..... dis 15 %
Wrenches.—Coes' Genuine ..... dis 35½ %
Coes' Pattern ..... dis 10 %
Tuft's ..... dis 60 %

St. Louis Metal Market.

(Corrected Weekly by Messrs. R. Sellers & Co.

Tin Plate.

IC, 10x14, Char	$11 00@11 50	IX, continuous, 20 in. x 200 ft	
IX, 10x14, "	14 50	IC, 10x14, best	
IC, 12x12, "	12 00	Coke	$10 50 @ 11 00
IX, 12x12, "	15 00	IC, 10x14, good Coke	10 00
IC, 14x20, "	12 50	IC, 10x20	11 00
IX, 14x20, "	15 50	IX, 10x20	13 00
IC, 14x20, Terne	$10 75@11 00	IC, 14x20	10 00
IX, 14x20, "	13 00	IC, 14x20, Coke Lead	9 50
IC, 20x28, "	21 50@22 00	IX, 10x14, punch'd for Safes	10 00
IX, 20x28, "	25 50@26 00		
IC, continuous, 20 in. x 200 ft			

Block Tin.

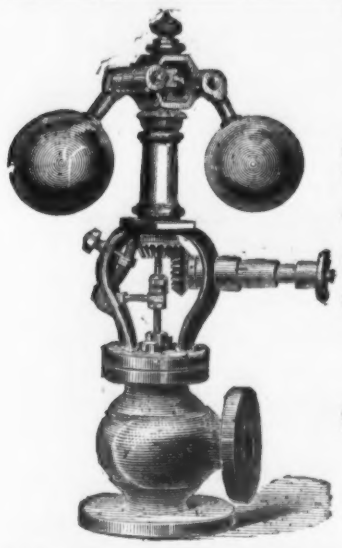
Large Pigs	28c	Bars	30c
Small "	29c		

Sheet Zinc.

Casks	₱ lb	9½c	Sheet ₱ lb 10¼c

Solder.

No. 1,



TO ALL WHO USE STEAM-POWER!

We will put our Governor on any Engine, and guarantee it to prove itself superior to all others.

If, after a fair trial, it does not, we will take it off at our own expense.

Shive Governor Co

BETHLEHEM, PA.

ALSO,

SHIVE'S PATENT WATCHMAN'S CLOCK AND DETECTOR.

The Best and Cheapest Watcher of the Watchman made

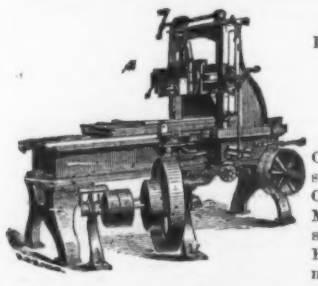
PRICE ONLY $15.

Circulars sent free.

The Pratt & Whitney Co.,

Hartford, Conn.,

Have constantly on hand and making



Drop Hammers

Of recently Improved Construction. Pony Trip Hammers, Blacksmiths' Sheaves, Broaching and Stamping Presses, Iron Shop Cranes, Machinists' Tools, Gun and Sewing Machine Machinery. Make to order Gray and Charcoal Iron Castings of all styles and sizes not exceeding 15 tons weight, (making patterns if desired). Furnish Clamp Pulleys of light patterns, cut gears in a superior manner, &c., &c.

RICHARD DUDGEON,

No. 24 Columbia Street, New York,

MAKER AND PATENTEE OF

Hydraulic Jacks and Punches,

ROLLER TUBE EXPANDERS

And Direct-Acting Steam Hammers.

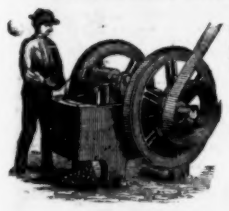
Communications by letter will receive prompt attention.

JACKS for Pressing on Car Wheels or CRANK PINS made to order.

BLAKE'S PATENT

STONE & ORE BREAKER.

New Pattern with Important Improvements & Abundant Strength



For reducing to fragments all kinds of hard and brittle substances, such as STONE for making the most perfect McADAM ROADS, and for making the best CONCRETE. It breaks stone at trifling cost for BALLASTING RAILROADS It is extensively in use in MINING operations, for crushing

IRON, COPPER, ZINC, SILVER, GOLD, and other ORES.

Also for crushing **Quartz, Flint, Emery, Corundum, Feldspar, Coal, Barytes, Manganese, Phosphate Rock, Plaster, Soapstone, &c.**

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BLAKE CRUSHER CO., New Haven, Conn.

Persons visiting New York, can be shown a crusher in operation at 127 Elm St

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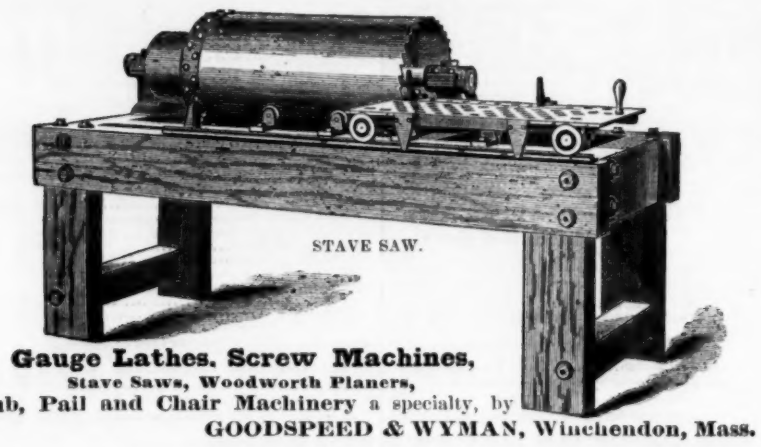

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Gauge Lathes. Screw Machines,

Stave Saws, Woodworth Planers,

Tub, Pail and Chair Machinery a specialty, by

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CORLISS STEAM ENGINE.

The Best in the World for Economy in Fuel and Cost of Running.

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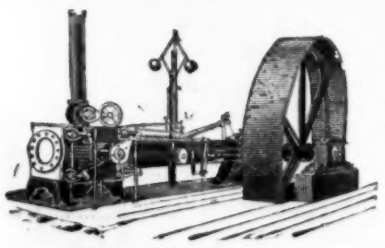

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Engineers, Machinists, Founders,

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Stationary Engines, Shafting, Mill Gearing, Hoisting Machines, Improved Piston Packing and Machinery.

Special attention given to Boring Ports and Cylinders.

Philadelphia Forging Works.

MANUFACTURERS OF

Wrought Iron Carriage & Wagon Hardware

AND ALL DESCRIPTIONS OF

Steel & Iron Drop Forgings.

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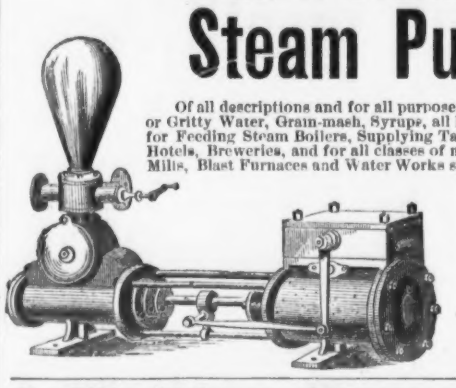
Guild & Garrison's Steam Pump Works,

Nos. 30 to 34 First Street, Williamsburgh, N. Y., Manufacturers of

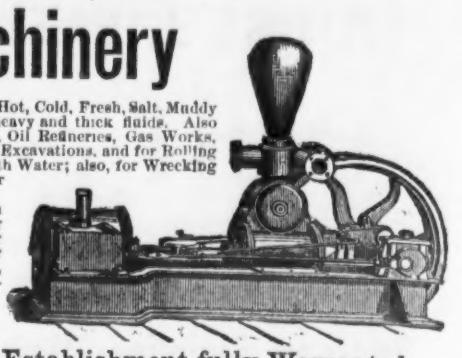
Steam Pumping Machinery



Of all descriptions and for all purposes, of any proportion or size, for pumping Hot, Cold, Fresh, Salt, Muddy or Gritty Water, Grain-mash, Syrups, all kinds of Beer, Acids, Molasses, and all heavy and thick fluids. Also for Feeding Steam Boilers, Supplying Tanks, and for Sugar Refineries, Tanneries, Oil Refineries, Gas Works, Hotels, Breweries, and for all classes of manufactories; for Draining Mines and Excavations, and for Rolling Mills, Blast Furnaces and Water Works supplying Cities, Towns and Villages with Water; also, for Wrecking purposes and Steam Fire Engines for Land and Sea.

Also, Manufacturers of Vacuum Pumps, Duplex and Single, and Copper or Iron Vacuum Pans of all sizes and for all purposes, with complete fixtures for Refining Sugar, Corn Syrup, Glue, &c., or for condensing Milk, Extracts, Chemicals, &c., &c.

Catalogues mailed on application.



All Work from this Establishment fully Warranted.

A Written Guarantee given with our Pumps.

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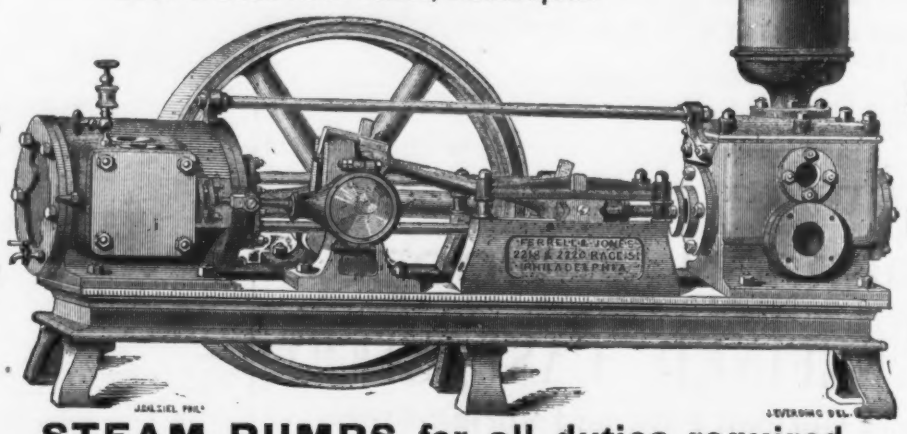
Fan Blowers.

Piston Blowers,

"FOULDS" Patent Water Elevator.



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STEAM PUMPS for all duties required.

Centrifugal, Hand and Power Pumps, Special Double Plunger Pumps for Mining Purposes. Boiler Feed and Tank Pumps.

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Manufacturers of the Celebrated

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With recent valuable improvements.

Steam Boilers

Constantly on hand and made to order of any size or style. Special attention given to the manufacture of

MILL WORK

And all kinds of Machinery.

CASTINGS

Of any size or style. Direct all letters to **The Woodruff Iron Works, Hartford, Conn.**, as the Woodruff & Beach Iron Works and firm of Woodruff & Beach are both dissolved.

Revised Price List of the Stiles Power Press.

Number	1	2	3	3½	4	4½	5	BACK GEAR.	3	4	5
Price...$	175	275	375	400	500	550	650		550	750	1000
Weight about...lbs	600	1000	1800	2000	3000	3250	5000		2300	4200	6500
Size of opening in bed...in	4x6	5x8	7x10	10x10	9x12	14x20	11x14		7x10	9x12	11x14
Diameter of fly wheel...in	22	28	33	33	40	40	50		32	36	48
Weight of fly wheel...lbs	125	225	400	400	650	650	1000		275	470	825

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THE STILES & PARKER PRESS COMPANY,

MIDDLETOWN CONN.

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Manufacturers of

Engine Lathes,

From twelve (12) to forty-eight (48) inches swing;

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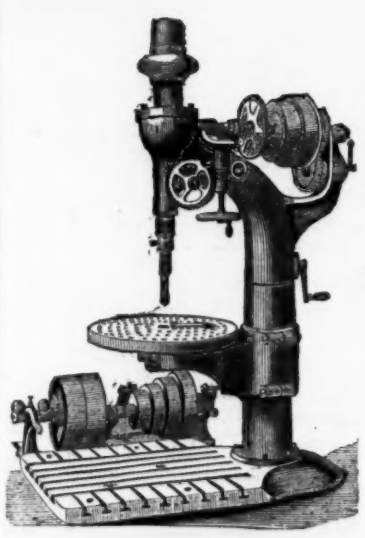

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The most perfect Labor Saving Tool ever invented for its purposes. Warranted to do five times the work possible with any other screw plate. Also *HAND BOLT CUTTING MACHINES*, ranging in price from $60 to $300. *POWER BOLT CUTTERS*, from $175 to $350.

FINE FRICTION CLUTCHES.

WILEY & RUSSELL, Greenfield, Mass.

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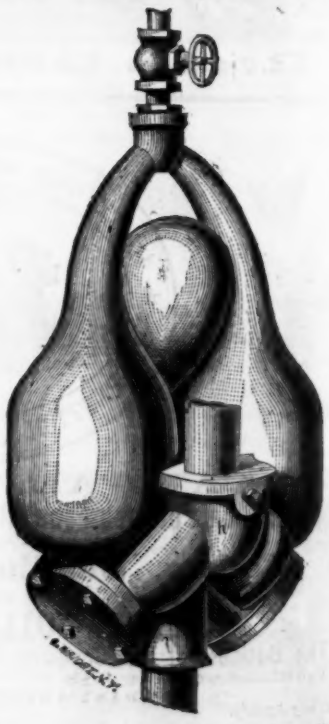

The simplest, most durable and effective Steam Pump now in use. Will pump gritty or muddy water, without wear or injury to its parts. It cannot get out of order.

BRANCH DEPOTS.

11 Pemberton Square, Boston.
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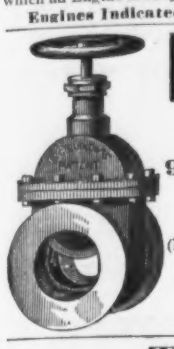
Builder of ***Vertical Steam Engines and Boilers,*** peculiar for their economy of space and fuel, safety and quickness in raising Steam. Also, sole manufacturer of ***Improved Balance Governor*** with automatic stop, ***Balance Slide Valve, Safety Valves, Stop Valves, Improved Pistons for Engines,*** which require no setting by the Engineer. Engine Builders and Dealers supplied with ***Governors, Stop Valves, Safety Valves, &c., &c.*** These governors are fitted up in the very best manner, with brass Valves and Seats, which will not corrode or stick fast. Guaranteed to regulate under any irregular load which an Engine is subject to. Millwright work executed, and Machinery in general satisfactorily repaired.

Engines Indicated Promptly and with the Greatest Accuracy.



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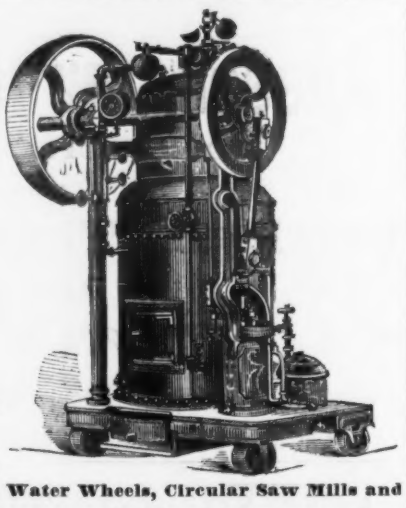

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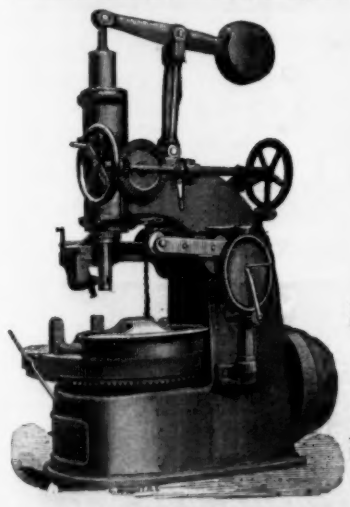

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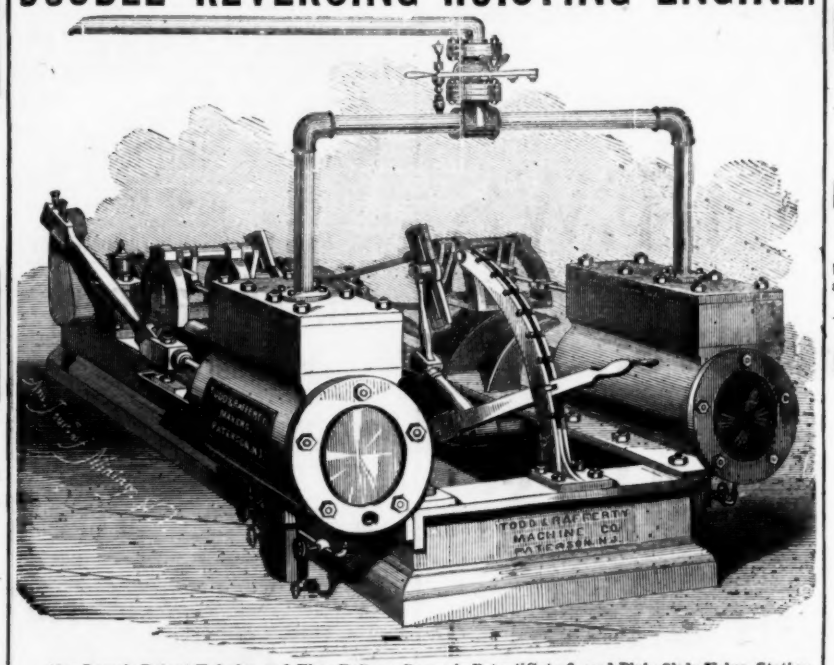

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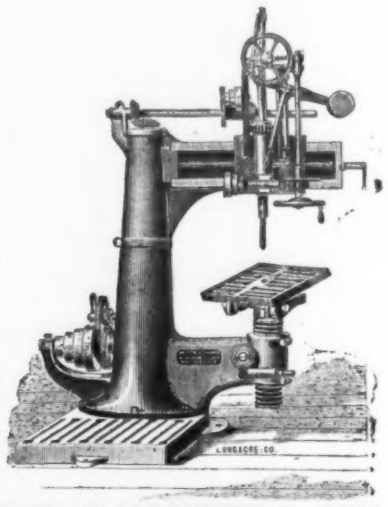

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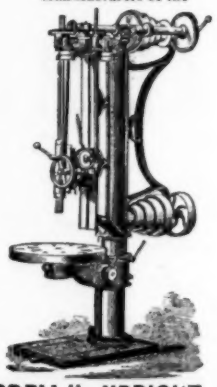

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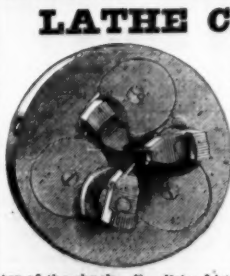

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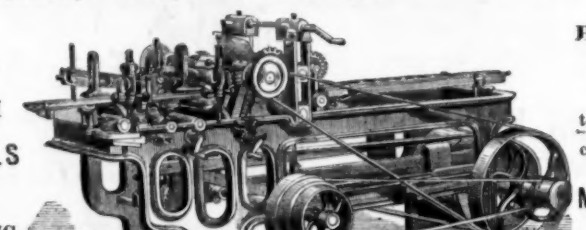

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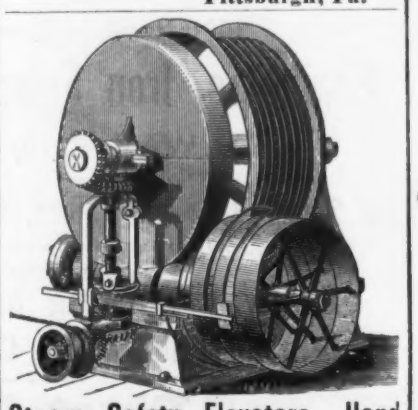

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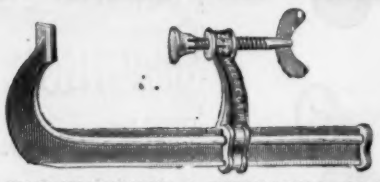

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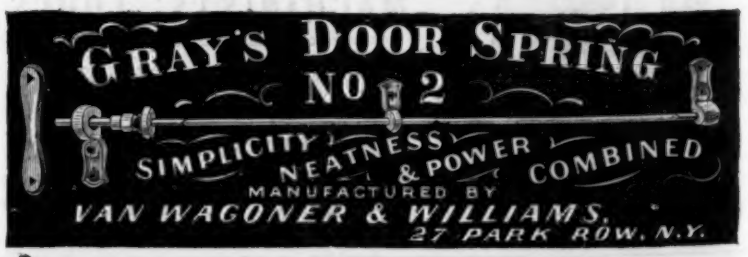

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